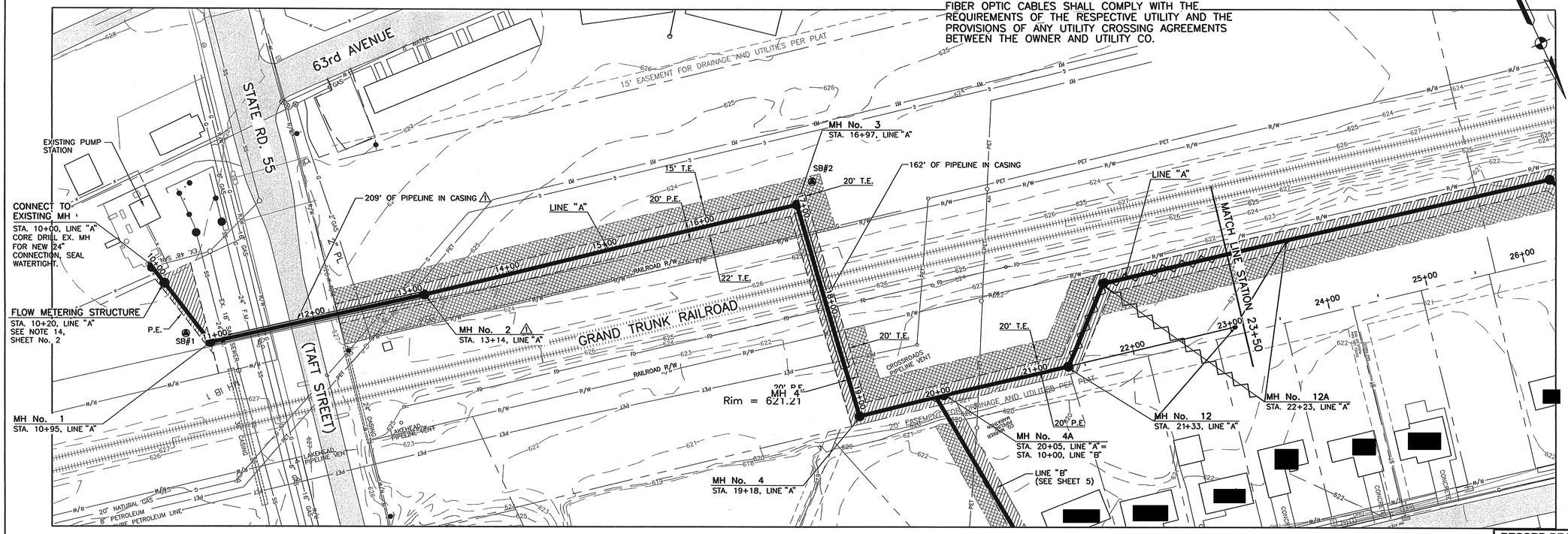
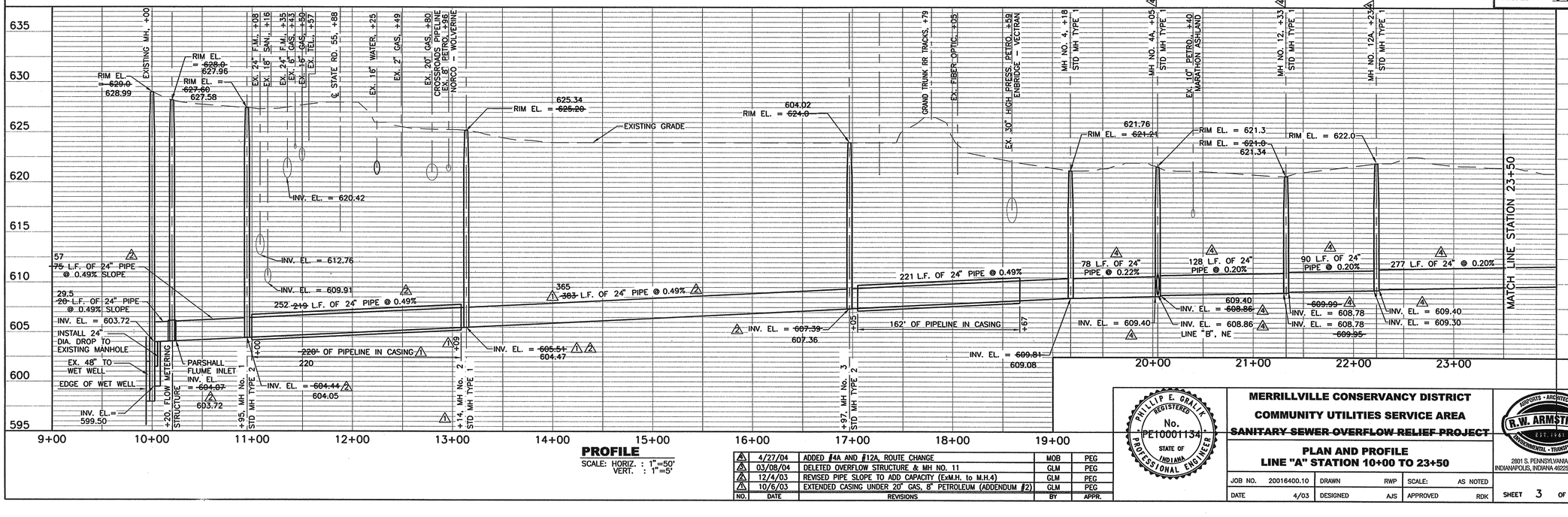
NOTE: ALL CONSTRUCTION IN THIS AREA OF PIPELINES AND FIBER OPTIC CABLES SHALL COMPLY WITH THE REQUIREMENTS OF THE RESPECTIVE UTILITY AND THE PROVISIONS OF ANY UTILITY CROSSING AGREEMENTS BETWEEN THE OWNER AND UTILITY CO.



PLAN
SCALE: 1"=50'



PROFILE
SCALE: HORIZ. : 1"=50'
VERT. : 1"=5'

RECORD DRAWING
DRAWN BY: RWP
DATE: 8-24-05

NO.	DATE	REVISIONS	BY	APPR.
4	4/27/04	ADDED #4A AND #12A, ROUTE CHANGE	MOB	PEG
3	03/08/04	DELETED OVERFLOW STRUCTURE & MH NO. 11	GLM	PEG
2	12/4/03	REVISED PIPE SLOPE TO ADD CAPACITY (ExM.H. to M.H.4)	GLM	PEG
1	10/6/03	EXTENDED CASING UNDER 20" GAS, 8" PETROLEUM (ADDENDUM #2)	GLM	PEG

PHILLIP E. GRALIK REGISTERED No. PE10001134 STATE OF INDIANA PROFESSIONAL ENGINEER

MERRILLVILLE CONSERVANCY DISTRICT
COMMUNITY UTILITIES SERVICE AREA
~~**SANITARY SEWER OVERFLOW RELIEF PROJECT**~~

PLAN AND PROFILE
LINE "A" STATION 10+00 TO 23+50

JOB NO.	20016400.10	DRAWN	RWP	SCALE:	AS NOTED
DATE	4/03	DESIGNED	AJS	APPROVED	RDK

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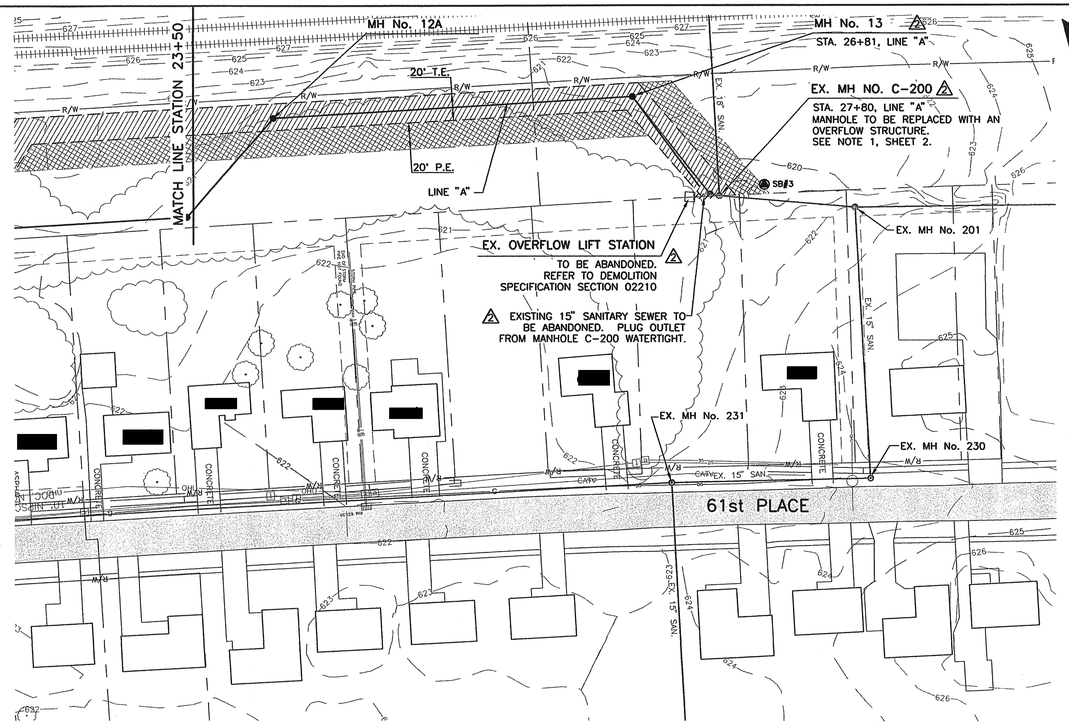
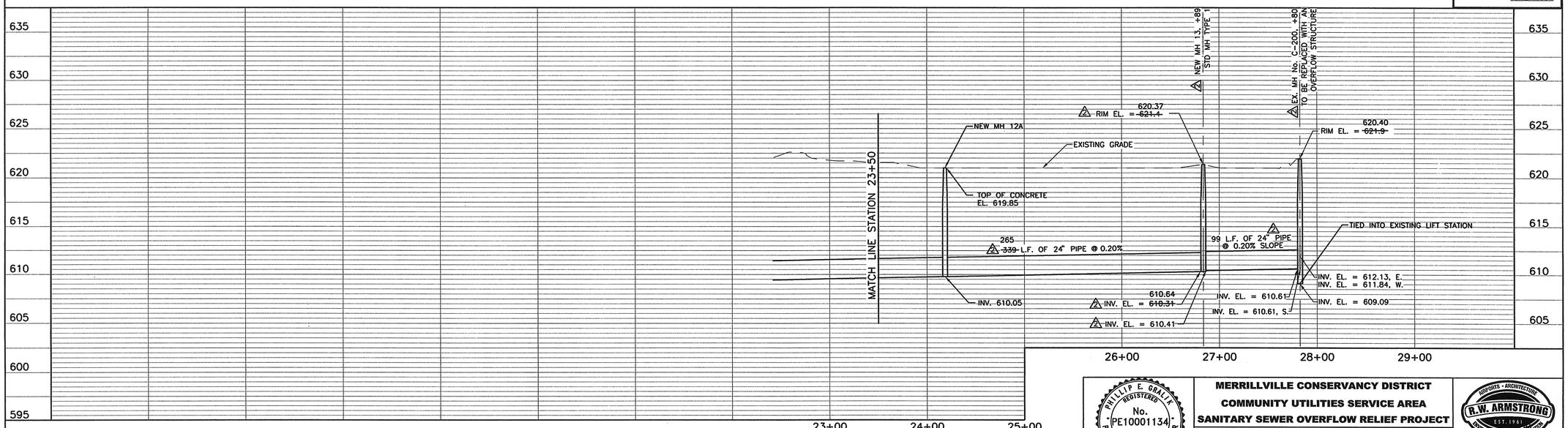


PLAN
SCALE: 1"=50'

RECORD DRAWING
DRAWN BY: RWP
DATE: 8-24-05



PROFILE
SCALE: HORIZ. : 1"=50'
VERT. : 1"=5'

NO.	DATE	REVISIONS	BY	APPR.
4				
3				
2	4/27/04	ADDED MH 13, ROUTE CHANGE, UPDATED PROFILE	MOB	PEG
1	3/08/04	DELETED OVERFLOW STRUCTURE AND MH NO. 11	GLM	PEG

PHILLIP E. GRALIK REGISTERED No. PE10001134 STATE OF INDIANA PROFESSIONAL ENGINEER

MERRILLVILLE CONSERVANCY DISTRICT
COMMUNITY UTILITIES SERVICE AREA
SANITARY SEWER OVERFLOW RELIEF PROJECT
PLAN AND PROFILE
LINE "A" STATION 23+50 TO 27+80 2

JOB NO. 20016400.10	DRAWN RWP	SCALE: AS NOTED	
DATE 4/03	DESIGNED AJS	APPROVED RDK	SHEET 4 OF 8

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EST. 1961
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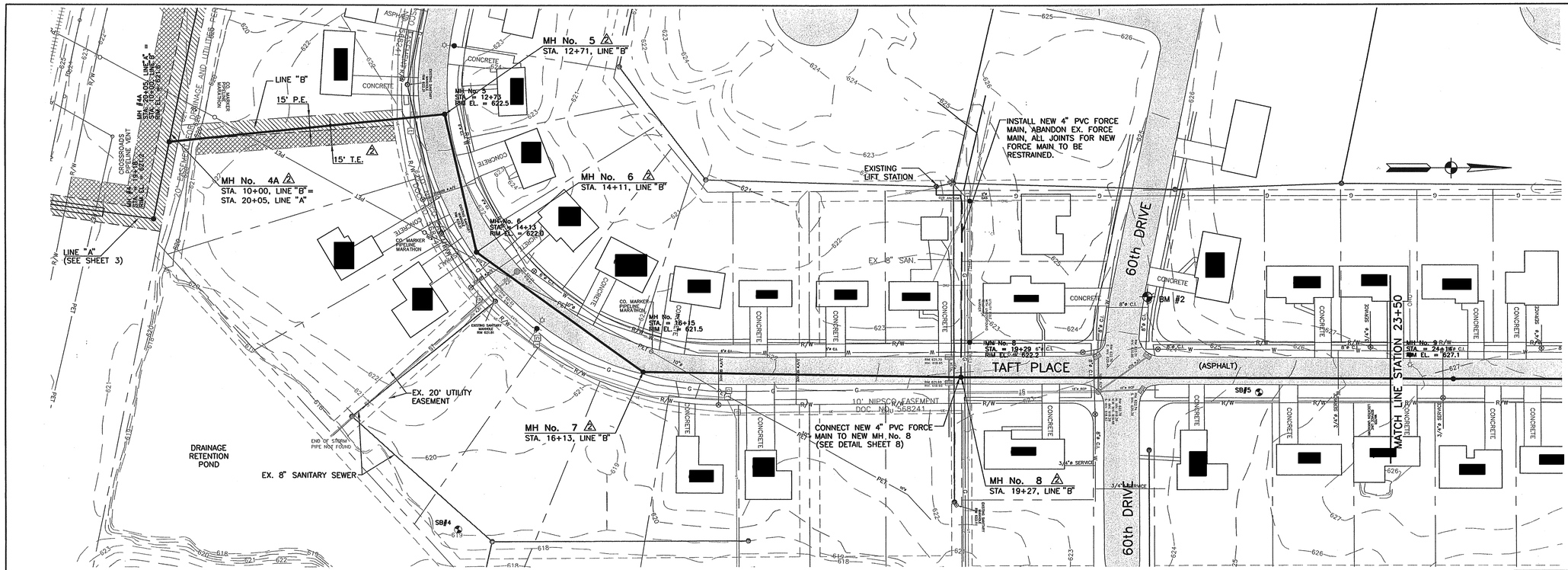
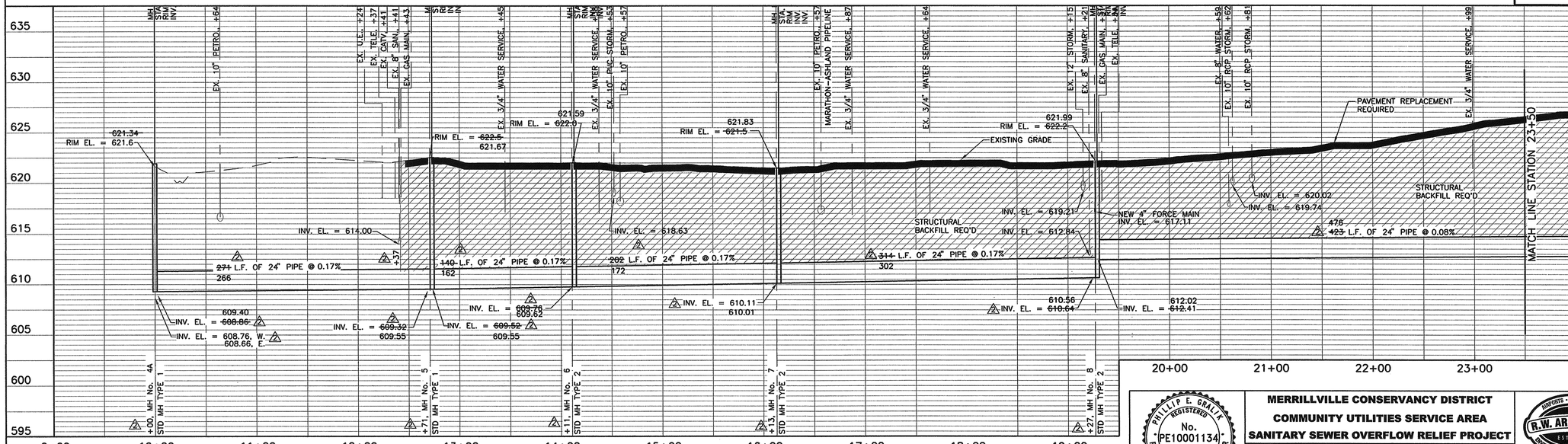
INDIANAPOLIS, INDIANA 46225 (317) 786-0461



PLAN
SCALE: 1"=50'



PROFILE
SCALE: HORIZ. : 1"=50'
VERT. : 1"=5'

RECORD DRAWING
DRAWN BY: RWP
DATE: 8-24-05

NO.	DATE	REVISIONS	BY	APPR.
4				
3				
2	5/13/04	ADDED MH 4A, MOVED 5-7, ADJUSTED STATIONING FROM BEGINNING	MOB	PEG
1	2/13/04	CHANGE ALIGNMENT BETWEEN MH'S 5 AND 7, SHIFTED ALIGNMENT TO EAST HALF OF STREET.	GLM	PEG

PHILLIP E. GRALIK
REGISTERED
No. PE10001134
STATE OF INDIANA
PROFESSIONAL ENGINEER

MERRILLVILLE CONSERVANCY DISTRICT
COMMUNITY UTILITIES SERVICE AREA
SANITARY SEWER OVERFLOW RELIEF PROJECT

PLAN AND PROFILE
LINE "B" STATION 10+00 TO 23+50

JOB NO.	20016400.10	DRAWN	RWP	SCALE:	AS NOTED
DATE	4/03	DESIGNED	AJS	APPROVED	RDK

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ENVIRONMENTAL • TRANSPORTATION
EST. 1961
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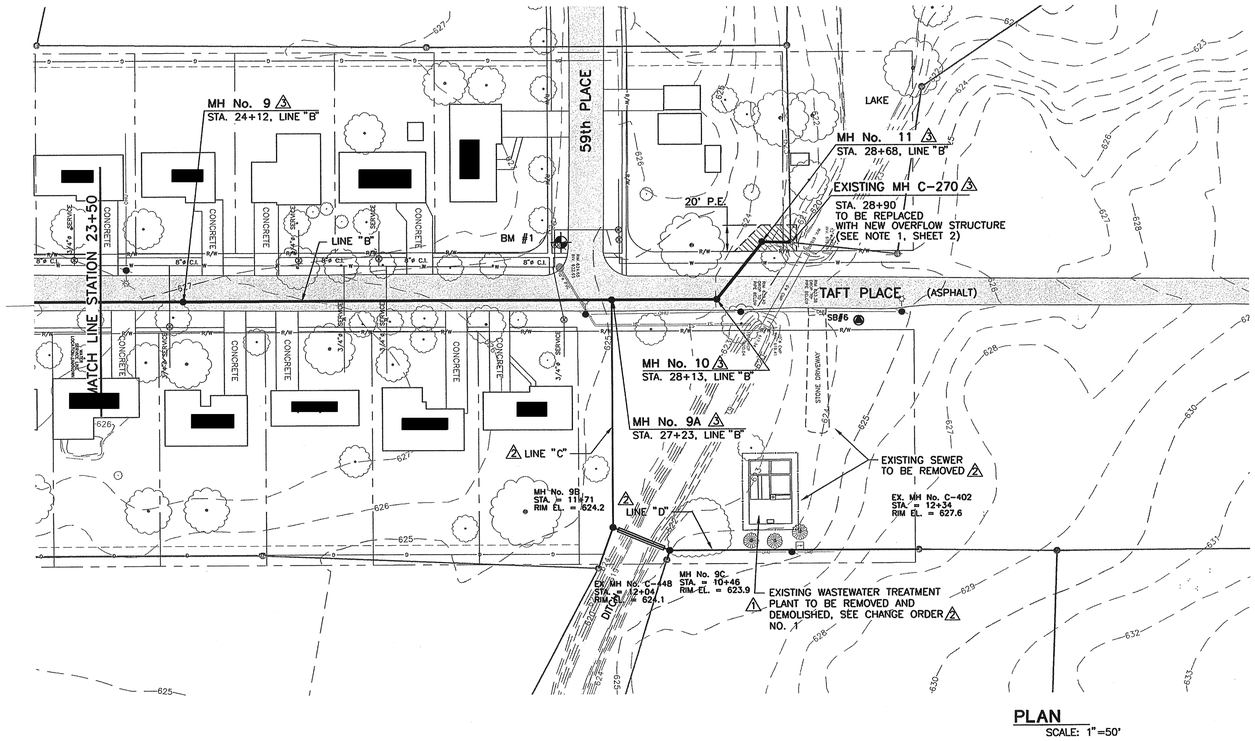
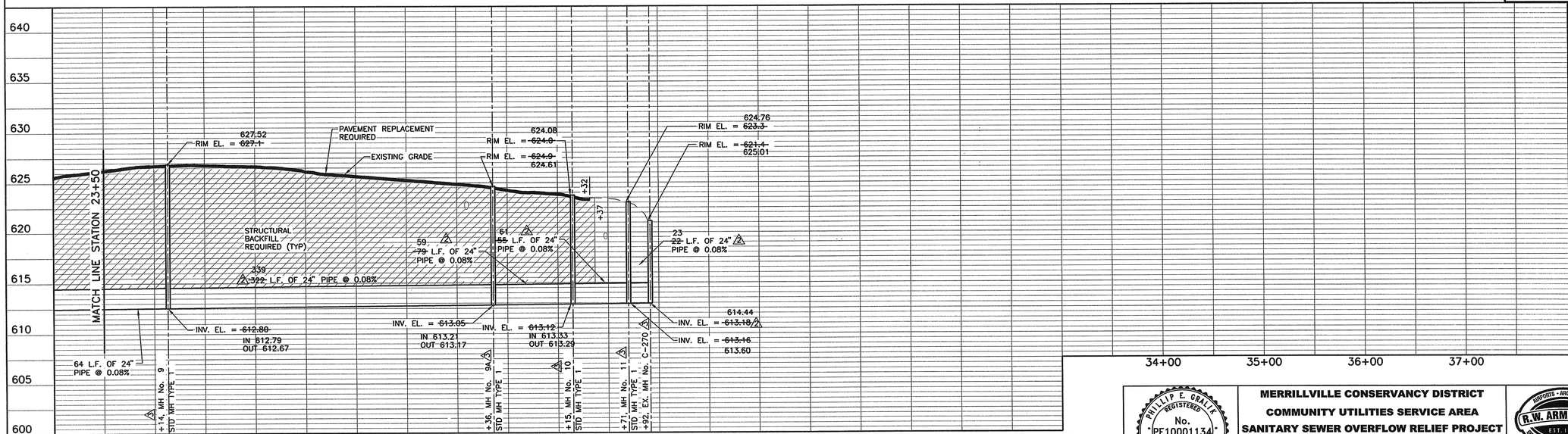


PLAN
SCALE: 1"=50'

△ NOTES

1. SEE ADDITIONAL PLAN SHEETS 1 AND 2 FOR ADDITIONAL WORK ITEMS ADDED UNDER CHANGE ORDER NO. 1.
2. LINE "C" AND "D" HAVE BEEN ADDED TO THE PROJECT UNDER CHANGE ORDER NO. 1, SEE ADDITIONAL PLAN SHEETS 1 AND 2.
3. ALL STATIONING ON THIS SHEET HAS BEEN REVISED DUE TO THE ALIGNMENT CHANGES BETWEEN MANHOLES 5 AND 7 AND SHIFTING THE SEWER TO THE EAST HALF OF STREET.

RECORD DRAWING
DRAWN BY: RWP
DATE: 8-24-05



PROFILE
SCALE: HORIZ. : 1"=50'
VERT. : 1"=5'

NO.	DATE	REVISIONS	BY	APPR.
4				
3	5/13/04	REVISED STATIONING AFTER MOVING MH 4-7	MOB	PEG
2	2/13/04	ADDED CHANGE ORDER NO. 1 ITEMS (WWTP DEMO, LINE "C" AND "D") SHIFTED SEWER TO EAST HALF OF STREET, ALIGNMENT CHANGES (5 - 7)	GLM	PEG
1	10/6/03	DELETED DEMOLITION OF EXISTING WWTP (ADDENDUM #2)	GLM	PEG

PHILLIP E. GRALIK
REGISTERED
No. PE10001134
STATE OF INDIANA
PROFESSIONAL ENGINEER

MERRILLVILLE CONSERVANCY DISTRICT
COMMUNITY UTILITIES SERVICE AREA
SANITARY SEWER OVERFLOW RELIEF PROJECT
PLAN AND PROFILE
LINE "B" STATION 23+50 TO 28+90 △3

JOB NO.	20016400.10	DRAWN	RWP	SCALE:	AS NOTED
DATE	4/03	DESIGNED	AJS	APPROVED	RDK

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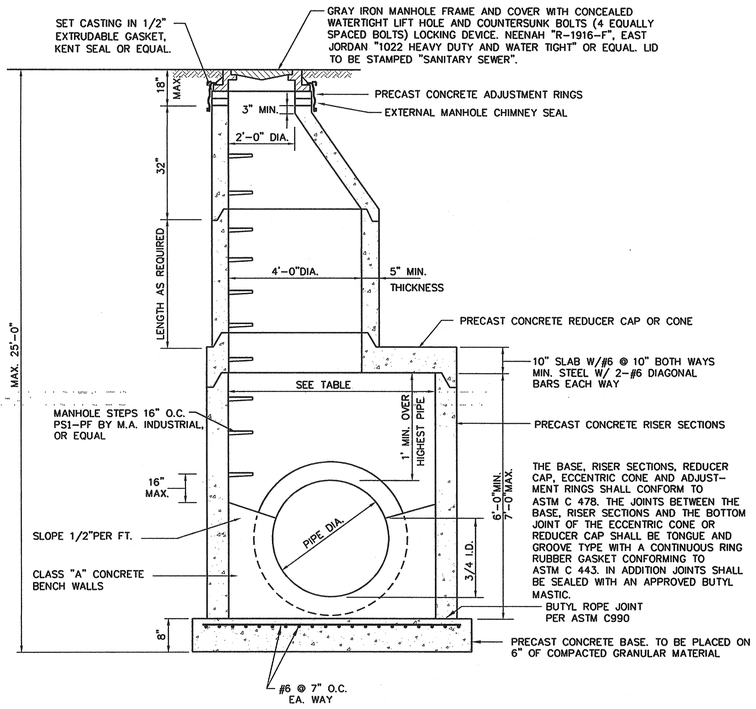
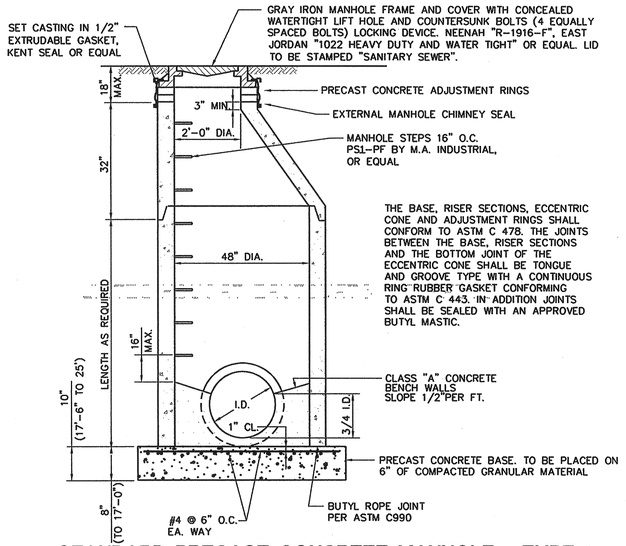
SHEET 6 OF 8



STANDARD PRECAST CONCRETE MANHOLE - TYPE 2

SEE TABLE FOR MAXIMUM INSIDE DIAMETER FOR CONNECTING SEWER

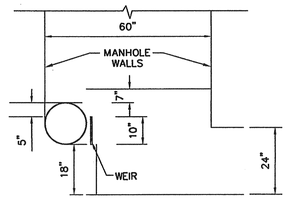
NOT TO SCALE



STANDARD PRECAST CONCRETE MANHOLE - TYPE 1

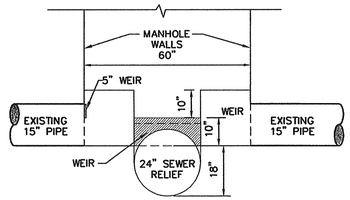
NOT TO SCALE

MINIMUM MANHOLE DIAMETER FOR VARIOUS SIZE SEWERS				
MIN. INSIDE MANHOLE DIAMETER, INCHES	SEWER PIPE DEFLECTION THROUGH MANHOLE, DEGREES	TYPE OF SEWER PIPE & SIZE		
		PVC	CLAY	DI/ FIBER
48	0 – 45	27"	21"	24"
48	46 – 90	21"	18"	20"
60	0 – 45	36"	30"	36"
60	46 – 90	27"	21"	24"
72	0 – 45	42"	36"	42"
72	46 – 90	30"	24"	30"
84	0 – 45	48"	42"	48"
84	46 – 90	36"	30"	36"
96	46 – 90	42"	36"	42"
108	46 – 90	48"	42"	48"



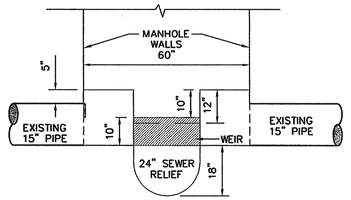
VIEW "1"

NOT TO SCALE



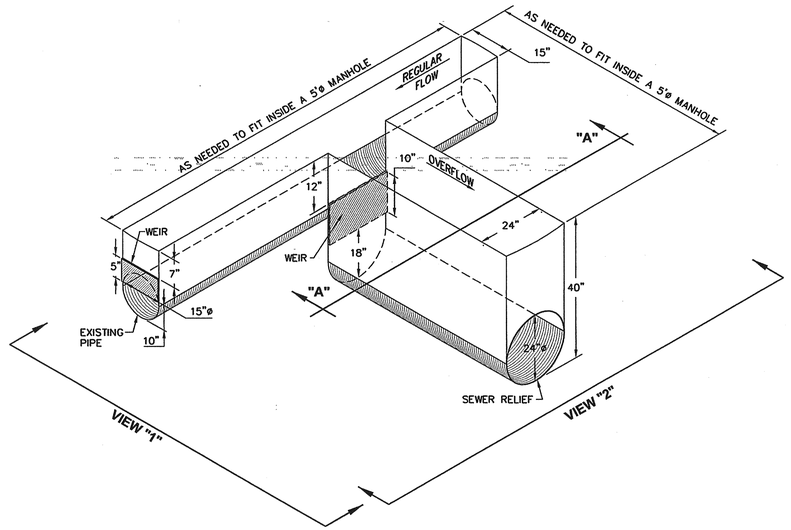
VIEW "2"

NOT TO SCALE



SECTION "A-A"

NOT TO SCALE



OVERFLOW STRUCTURE TROUGH DETAIL

NOT TO SCALE

RECORD DRAWING
DRAWN BY: RWP
DATE: 8-24-05

PHILLIP E. GRALIK REGISTERED No. PE10001134 STATE OF INDIANA PROFESSIONAL ENGINEER

NO.	DATE	REVISIONS	BY	APPR.
4				
3				
2				
1				

MERRILLVILLE CONSERVANCY DISTRICT
COMMUNITY UTILITIES SERVICE AREA
SANITARY SEWER OVERFLOW RELIEF PROJECT
MISCELLANEOUS DETAILS

JOB NO. 20016400.10	DRAWN RWP	SCALE: AS NOTED
DATE 4/03	DESIGNED AJS	APPROVED RDK

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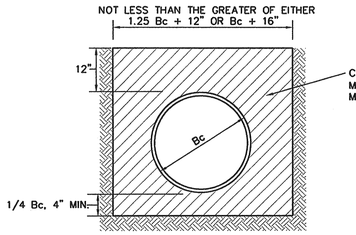
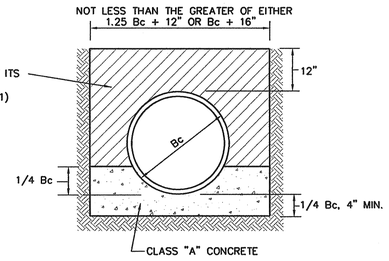
2001 S. PENNSYLVANIA STREET INDIANAPOLIS, INDIANA 46225 (317) 788-0461

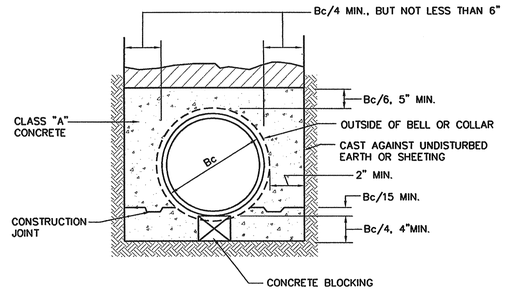


NOTE: IN ROCK TRENCH, EXCAVATE AT LEAST 6" BELOW THE BELL OF THE PIPE.

STANDARD BEDDING

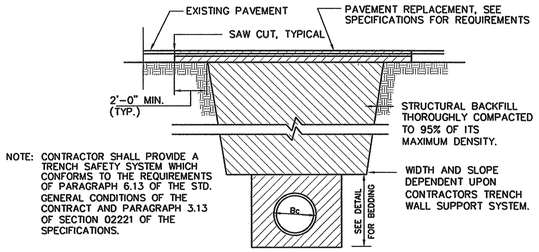


CONCRETE CRADLE



CONCRETE ENCASEMENT

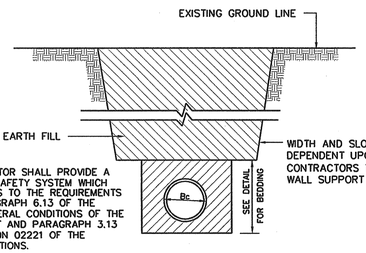
BEDDING DETAILS



NOTE: CONTRACTOR SHALL PROVIDE A TRENCH SAFETY SYSTEM WHICH CONFORMS TO THE REQUIREMENTS OF PARAGRAPH 6.13 OF THE STD. GENERAL CONDITIONS OF THE CONTRACT AND PARAGRAPH 3.13 OF SECTION 02221 OF THE SPECIFICATIONS.

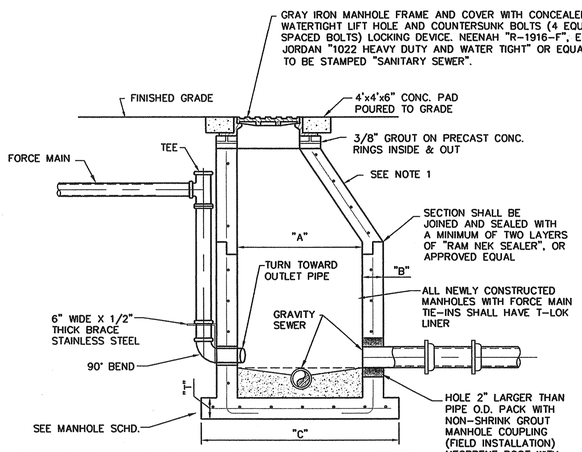
TRENCH AND BACKFILL UNDER PAVEMENT AND OTHER LOCATIONS DETAIL*

*AS SPECIFIED IN SECTION 02221 OF THE SPECIFICATIONS



NOTE: CONTRACTOR SHALL PROVIDE A TRENCH SAFETY SYSTEM WHICH CONFORMS TO THE REQUIREMENTS OF PARAGRAPH 6.13 OF THE STD. GENERAL CONDITIONS OF THE CONTRACT AND PARAGRAPH 3.13 OF SECTION 02221 OF THE SPECIFICATIONS.

TRENCH AND BACKFILL DETAIL

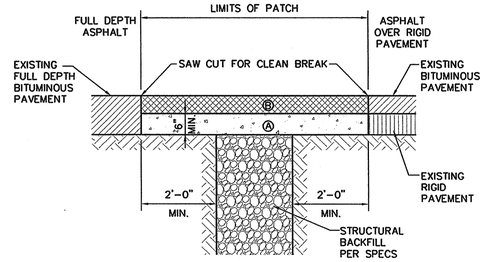


PIPE DIA.	"A"	"B"	"C"	BOT. SLAB "T"
8"–24"	4'–0"	"8"	70"	8"
30"–36"	5'–0"	"8"	84"	10"
42"–48"	6'–0"	"8"	96"	12"

TYPICAL MANHOLE DIMENSIONS

NOTES:
1. ALL CONCRETE MANHOLES TO BE 4000 P.S.I. TO MEET OR EXCEED ASTM C478 ALL CEMENT TO BE TYPE II ACID RESISTANT. REINFORCING AREA OF 0.20 SQ. IN/FT FOR WALL SECTION MIN. TO MEET OR EXCEED ASTM A 185.
2. A MAXIMUM OF 2 LAYERS OF PRECAST CONCRETE RINGS, IF REQUIRED.
3. FORCE MAIN TIE-IN SHALL BE TO MANHOLES WITH A MINIMUM DEPTH OF 4'–6"

FORCE MAIN TIE-IN AT PRECAST MANHOLE



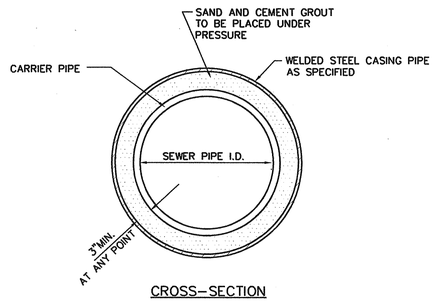
Ⓐ PLAIN CONCRETE IS TO BE FINISHED FLUSH TO THE EXISTING RIGID PAVEMENT OR 2" BELOW EXISTING ASPHALT SURFACE.

Ⓑ HOT ASPHALTIC MATERIAL IS TO BE FINISHED FLUSH TO THE EXISTING BITUMINOUS MATERIAL AND IS TO BE COMPACTED TO 95%.

NOTES

1. NEW SURFACE IS TO BE SLOPED AT THE SAME RATE AS THE EXISTING SURFACE.
2. EXISTING PAVEMENT IS TO BE SAW-CUT FOR A CLEAN BREAK.
3. COMPACTED AGGREGATE IS TO BE LAID AT 6" LIFTS AND IS TO BE COMPACTED TO A MINIMUM OF 100% OF MAXIMUM DRY DENSITY.
4. TRENCH SPOIL IS TO BE REMOVED FROM THE WORK SITE.
5. BITUMINOUS TACK APPLIED AS PER CURRENT ISSUE OF "INDIANA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS."
6. ALL JOINTS SHALL BE SAW-CUT TO A DEPTH OF 4" MINIMUM. BEFORE FINAL REMOVAL IS PERFORMED, ALL JOINTS BETWEEN EXISTING PAVEMENT AND NEW CONCRETE SHALL BE SMOOTH AND STRAIGHT. (CONCRETE AND ASPHALT PAVEMENT)
7. HI-EARLY CLASS A (SLAG) CONCRETE WITH 6%-8% AIR ENTRAINMENT WILL BE ALLOWED FOR SPECIAL APPLICATIONS, UPON APPROVAL OF PERMITTING AGENCY.
8. BLACK CONCRETE FINISH SHALL BE USED IN LOCATIONS AS DIRECTED BY THE PERMITTING AGENCY.
9. PAVEMENT PATCH SHALL BE SMOOTH AND LEVEL. NO MORE THAN 1/4" VARIATION FROM A STRAIGHT EDGE 5'-0" IN LENGTH SHALL BE ALLOWED. SMOOTH RIDE ABILITY MUST BE MAINTAINED.

ROAD CUT PATCHING DETAIL



CROSS-SECTION

PIPE IN CASING

RECORD DRAWING
DRAWN BY: RWP
DATE: 8-24-05

PHILLIP E. GRALIK REGISTERED No. PE10001134 STATE OF INDIANA PROFESSIONAL ENGINEER

NO.	DATE	REVISIONS	BY	APPR.
4				
3				
2				
1				

MERRILLVILLE CONSERVANCY DISTRICT
COMMUNITY UTILITIES SERVICE AREA
SANITARY SEWER OVERFLOW RELIEF PROJECT
MISCELLANEOUS DETAILS

JOB NO.	20016400.10	DRAWN	RWP	SCALE:	AS NOTED
DATE	4/03	DESIGNED	AJS	APPROVED	RDK

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INDIANAPOLIS, INDIANA 46225 (317) 788-0461

SHEET 8 OF 8

APPENDIX L

MCD'S WESTSIDE INTERCEPTOR SEWER PROJECT CONTRACT PLANS

MERRILLVILLE CONSERVANCY DISTRICT

LAKE COUNTY, INDIANA

WESTSIDE INTERCEPTOR SEWER PROJECT

SHEET INDEX	
SHEET NO.	DESCRIPTION
	TITLE SHEET
2	PLAN SHEET INDEX, GENERAL NOTES & SYMBOLS
3	PLAN & PROFILE – LINE "A", STA. 14+05 TO STA. 25+25
4	PLAN & PROFILE – LINE "A", STA. 25+25 TO STA. 34+50
5	PLAN & PROFILE – LINE "A", STA. 34+50 TO STA. 49+50
6	PLAN & PROFILE – LINE "A", STA. 49+50 TO STA. 62+50
7	PLAN & PROFILE – LINE "A", STA. 62+50 TO STA. 77+50
8	PLAN & PROFILE – LINE "A", STA. 77+50 TO STA. 92+50
9	PLAN & PROFILE – LINE "A", STA. 92+50 TO STA. 107+50
10	PLAN & PROFILE – LINE "A", STA. 107+50 TO STA. 121+50
11	PLAN & PROFILE – LINE "A", STA. 121+50 TO STA. 136+50
12	PLAN & PROFILE – LINE "A", STA. 136+50 TO STA. 143+77 & LINE "B"
13	MISCELLANEOUS DETAILS
14	MISCELLANEOUS DETAILS

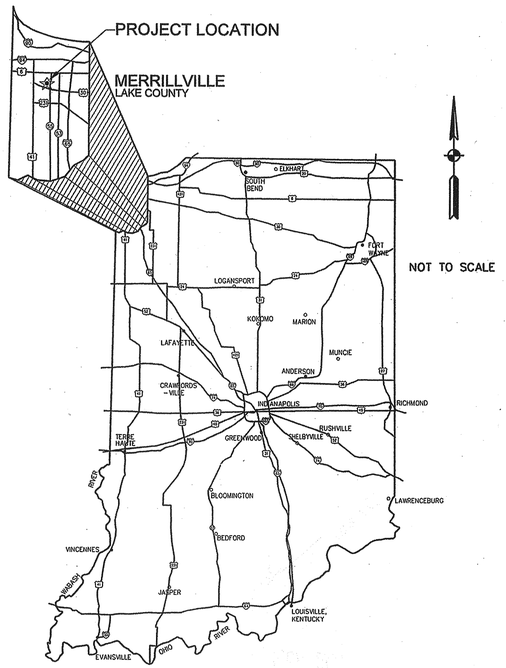
EROSION CONTROL LEGEND (TYPICAL)

SILT FENCE —x—x—

EROSION BLANKETS

PERMANENT SEED

WETLAND SEED



LOCATION MAP

APPROVED BY : MERRILLVILLE CONSERVANCY DISTRICT BOARD OF DIRECTORS

Paul L. Volk		12-9-03
PAUL L. VOLK	CHAIRMAN OF THE BOARD	DATE
Milan Dakich		12-9-03
MILAN DAKICH	VICE-CHAIRMAN	DATE
Joseph T. Sanok		12-9-03
JOSEPH T. SANOK	SECRETARY/TREASURER	DATE
ABSENT		
THOMAS P. KEILMAN	BOARD MEMBER	DATE
Edward J. Westbury		12-09-03
EDWARD J. WESTBURY	BOARD MEMBER	DATE
Christine V. Savarese		12-09-03
CHRISTINE V. SAVARESE	DISTRICT MANAGER	DATE

CERTIFIED BY:

Phillip E. Gralik 12/05/03

PHILLIP E. GRALIK, P.E. 10001134 DATE

PHILLIP E. GRALIK REGISTERED No. PE10001134 STATE OF INDIANA PROFESSIONAL ENGINEER

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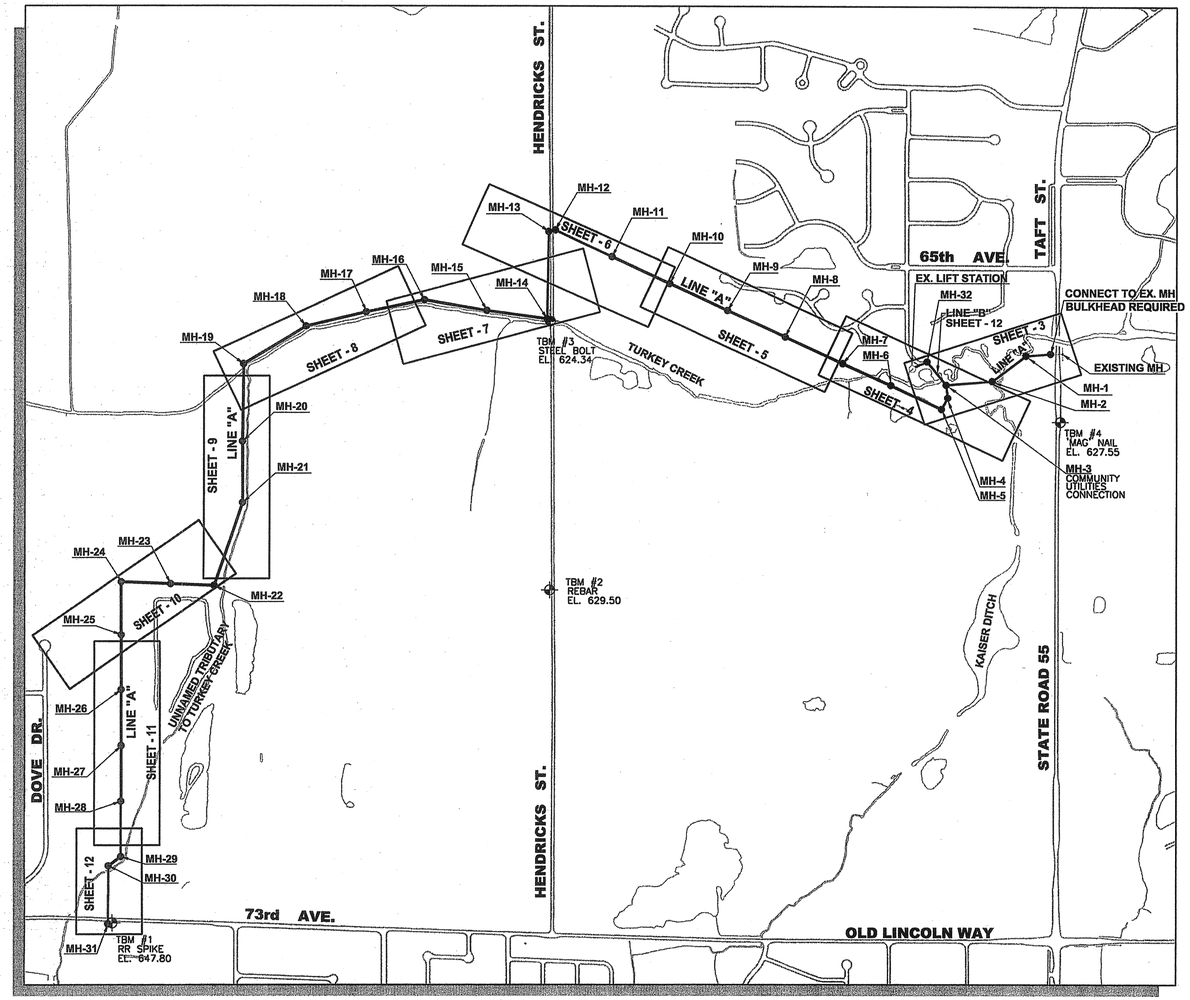
UNION STATION 300 S. MERIDIAN STREET
INDIANAPOLIS, INDIANA 46225
(317) 786-0461

8300 BROADWAY, SUITE E-1
MERRILLVILLE, INDIANA 46410
(219) 738-2258

Set No. 20



SCALE: 1"=500'

GENERAL NOTES

1. THE CONTRACTOR SHALL REVIEW AND TAKE NOTE OF THE REQUIREMENTS INCLUDED IN SPECIFICATIONS SECTION 1, PARAGRAPH 6 "STRUCTURES ENCOUNTERED". UTILITY BUILDING SERVICE LINES ARE NOT INDICATED ON THE PLANS. ALL SERVICE LINES CUT OR DAMAGED BY THE CONTRACTOR SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE TO A CONDITION EQUAL TO OR BETTER THAN THE CONDITION OF THE ORIGINAL LINES, OR BE REPLACED WITH A LINE OF THE SAME MATERIAL AND SIZE.
2. THE CONTRACTOR SHALL INSTALL A SECURE WATERTIGHT BULKHEAD OR PLUG IN THE SANITARY SEWER TO PREVENT FLOODING OF THE FACILITIES OR ADJACENT CONNECTING FACILITIES. THE BULKHEAD OR PLUG SHALL BE INSTALLED AT THE POINT OF CONNECTION TO THE EXISTING MANHOLE AT TAFT STREET. THE CONTRACTOR SHALL ONLY REMOVE THE BULKHEAD OR PLUG AFTER SATISFACTORY COMPLETION OF TESTING AND ANY REQUIRED CORRECTIVE WORK IN THE VARIOUS PORTIONS OF THE WORK AND UPON APPROVAL OF THE OWNER.
3. THE CONTRACTOR MAY CLOSE LOCAL ROADWAYS ONLY WITH THE APPROVAL OF THE APPROPRIATE HIGHWAY/STREET AUTHORITY AND AFTER DEVELOPING AND IMPLEMENTING A PLAN TO MAINTAIN LOCAL TRAFFIC AND EMERGENCY VEHICLE TRAFFIC AT ALL TIMES. THE CONTRACTOR SHALL PROVIDE LOCAL DETOUR AND OTHER SIGNAGE AND BARRICADES IN ACCORDANCE WITH INDOT SPECIFICATIONS. TRAFFIC MAINTENANCE AND SIGNAGE ALONG STATE ROAD 55 SHALL BE PER INDOT SPECIFICATIONS.
4. PRIOR TO BEGINNING ANY CONSTRUCTION WORK THE CONTRACTOR SHALL VERIFY ALL BENCH MARK ELEVATIONS AS WELL AS ELEVATIONS OF EXISTING SANITARY SEWERS AT THEIR POINT OF CONNECTION WITH THIS PROJECT. THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER OF ANY DISCREPANCIES FOUND BETWEEN HIS MEASURED ELEVATIONS AND THOSE SHOWN ON THE PLANS.
5. THE CONTRACTOR SHALL ROTATE THE ECCENTRIC CONE OF MANHOLES OR TAKE OTHER POSSIBLE ACTION TO LOCATE MANHOLE COVERS OUTSIDE OF THE WHEEL PATH OF VEHICLES WHERE MANHOLES ARE INSTALLED UNDER PAVEMENT.
6. DEMOLITION OF EXISTING COMMUNITY UTILITIES LIFT STATION SHALL NOT BEGIN UNTIL THE ENTIRE SEWER SYSTEM IN THIS PROJECT HAS BEEN INSTALLED, AND ALL TESTING COMPLETED AND ACCEPTED BY THE OWNER AND ENGINEER.
7. ALL SALVAGEABLE EQUIPMENT SHALL REMAIN THE PROPERTY OF THE OWNER AND SHALL BE REMOVED AND STORED AT A LOCATION DIRECTED BY THE OWNER.

SYMBOLS

	EXISTING POWER POLE
	EXISTING UTILITY POLE
MB	EXISTING MAIL BOX
	EXISTING POST
	EXISTING SIGN
TPED	EXISTING TELEPHONE PEDESTAL
SS	EXISTING SANITARY SEWER MANHOLE
	EXISTING BEEHIVE INLET
	EXISTING STORM CURB INLET
	EXISTING GAS VALVE
	EXISTING BUTTERFLY VALVE
	EXISTING FIRE HYDRANT W/ AUXILIARY VALVE
W	EXISTING WATER METER
OE	EXISTING OVERHEAD ELECTRIC
W	EXISTING WATER MAIN (SIZE AND TYPE NOTED)
G	EXISTING GAS MAIN
UT	EXISTING BURIED TELEPHONE
15"CMP	EXISTING CULVERT PIPE
	EXISTING EASEMENT
X	EXISTING FENCE
	EXISTING TREE
	EXISTING HEDGE
	EXISTING TREE LINE
	EXISTING BUSH
	APPROXIMATE PROPERTY LINE
R/W	APPROXIMATE RIGHT-OF-WAY
701	EXISTING 1' CONTOUR LINE
700	EXISTING 5' CONTOUR LINE
	NEW SANITARY SEWER AND MANHOLE

ABBREVIATIONS

CL	CENTER LINE
CMP	CORRUGATED METAL PIPE
ESMT	EASEMENT
E.	EAST
EL.	ELEVATION
HORIZ.	HORIZONTAL
INV.	INVERT
INV. EL.	INVERT ELEVATION
L.F.	LINEAR FEET
MH	MANHOLE
N.	NORTH
P.E.	PERMANENT EASEMENT
PVC	POLYVINYL CHLORIDE PIPE
RCP	REINFORCED CONCRETE PIPE
R/W	RIGHT OF WAY
S.	SOUTH
STA.	STATION
T.E.	TEMPORARY EASEMENT
TYP.	TYPICAL
W.	WEST

BENCHMARKS

TBM ID #	DESCRIPTION	ELEVATION
1	RAILROAD SPIKE SET IN SOUTH FACE OF WOOD UTILITY POLE 808/758 N 2272243.9198 E 2868143.1154	647.80
2	HUB SET SOUTH SIDE OF DRIVE TO VFW, 3' EAST OF RECTANGULAR STEEL POST 10' NORTH OF STEEL FENCE POST N 2274866.2353 E 2871583.5203	629.50
3	2" ø STEEL BOLT WITH PUNCH MARK IN CENTER NORTHWEST END OF BRIDGE ON WOOD ABUTTMENT N 2276990.6903 E 2871584.9066	624.34
4	"MAG" NAIL SET IN PAINT STRIPING OF TURNING LANE, 9.7' WEST OF STRAIN POLE NO. 863/844, 15.85' NORTHWEST OF FENCE CORNER N 2276190.7795 E 2875599.3948	627.55

HOLEY MOLEY SAYS
"DON'T DIG BLIND"

"IT'S THE LAW"
CALL 2 WORKING DAYS BEFORE YOU DIG
1-800-382-5544
CALL TOLL FREE
PER INDIANA STATE LAW IC-69-1991, IT IS AGAINST THE LAW TO EXCAVATE WITHOUT NOTIFYING THE UNDERGROUND LOCATION SERVICE TWO (2) WORKING DAYS BEFORE COMMENCING WORK.

NO.	DATE	REVISIONS	BY	APPR.
3				
2				
1				

PHILLIP E. GRALIK REGISTERED No. PE10001134 STATE OF INDIANA PROFESSIONAL ENGINEER

Phillip E. Gralik

MERRILLVILLE CONSERVANCY DISTRICT
LAKE COUNTY, INDIANA
WESTSIDE INTERCEPTOR SEWER PROJECT

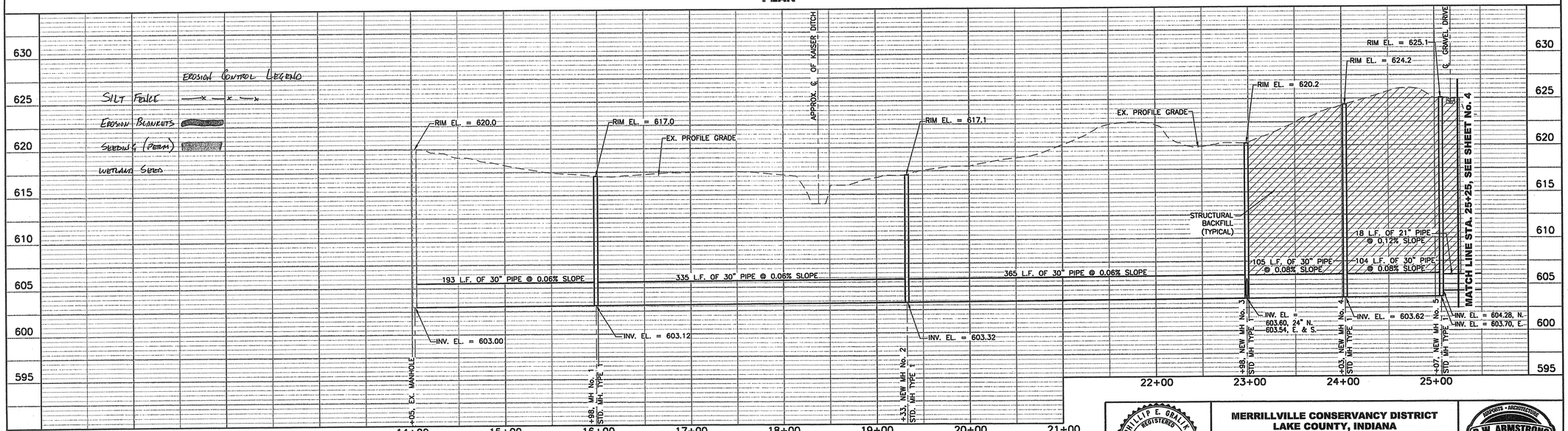
PLAN SHEET INDEX
GENERAL NOTES AND SYMBOLS

JOB NO. 20024530.1		DRAWN	RWP/MOB	SCALE:	AS NOTED
DATE	8/03	DESIGNED	AJS/GLM	APPROVED	AJS

REPORTS • ARCHITECTURE
R.W. ARMSTRONG
ENVIRONMENTAL • TRANSPORTATION
EST 1961

2001 S. PENNSYLVANIA STREET
INDIANAPOLIS, INDIANA 46225 (317) 786-0461

PLAN



PROFILE

NO.	DATE	REVISIONS	BY	APPR.
3				
2				
1				

PHILLIP E. GRALIK REGISTERED No. PE10001134 STATE OF INDIANA PROFESSIONAL ENGINEER

Phillip E. Gralik

MERRILLVILLE CONSERVANCY DISTRICT
LAKE COUNTY, INDIANA
WESTSIDE INTERCEPTOR SEWER PROJECT

PLAN AND PROFILE
LINE "A", STA. 14+05 TO STA. 25+25

JOB NO. 20024530.1	DRAWN	RWP/MOB	SCALE:	HORIZ.: 1"=50' VERT.: 1"=8'	
DATE 8/03	DESIGNED	AJS/GLM	APPROVED	AJS	SHEET 3 OF 14

R.W. ARMSTRONG
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EST. 1982
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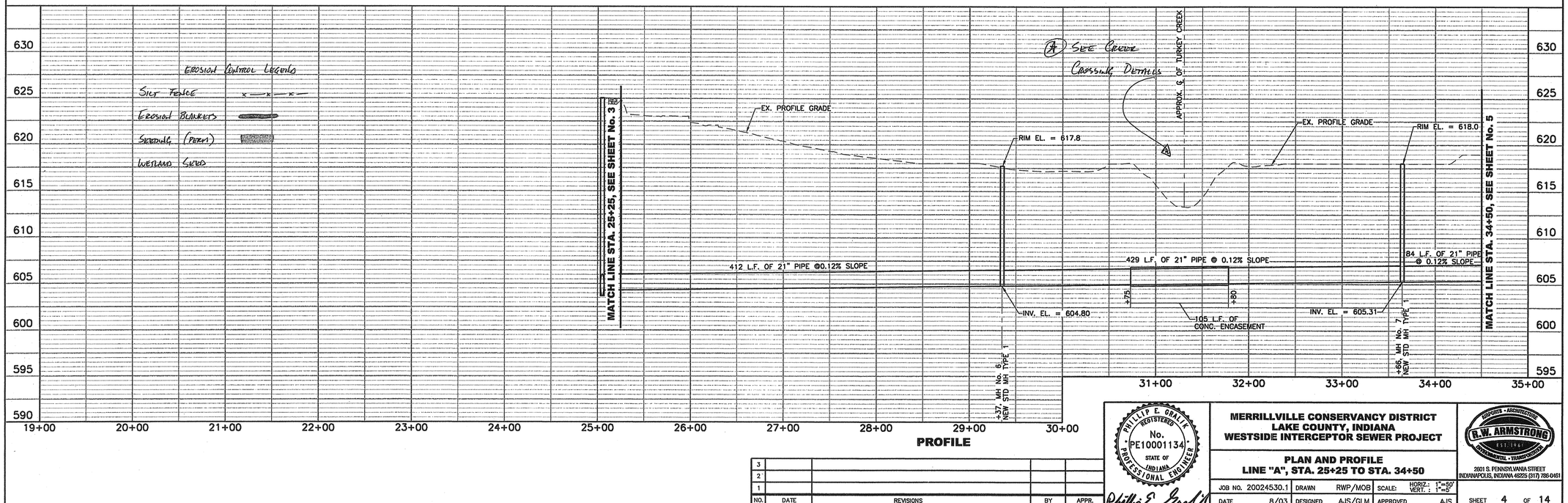
PLAN



PROFILE

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PHILLIP E. GRALIK REGISTERED No. PE10001134 STATE OF INDIANA PROFESSIONAL ENGINEER

Phillip E. Gralik

MERRILLVILLE CONSERVANCY DISTRICT
LAKE COUNTY, INDIANA
WESTSIDE INTERCEPTOR SEWER PROJECT

PLAN AND PROFILE
LINE "A", STA. 25+25 TO STA. 34+50

JOB NO. 20024530.1	DRAWN	RWP/MOB	SCALE:	HORIZ.: 1"=50' VERT.: 1"=5'
DATE 8/03	DESIGNED	AJS/GLM	APPROVED	AJS

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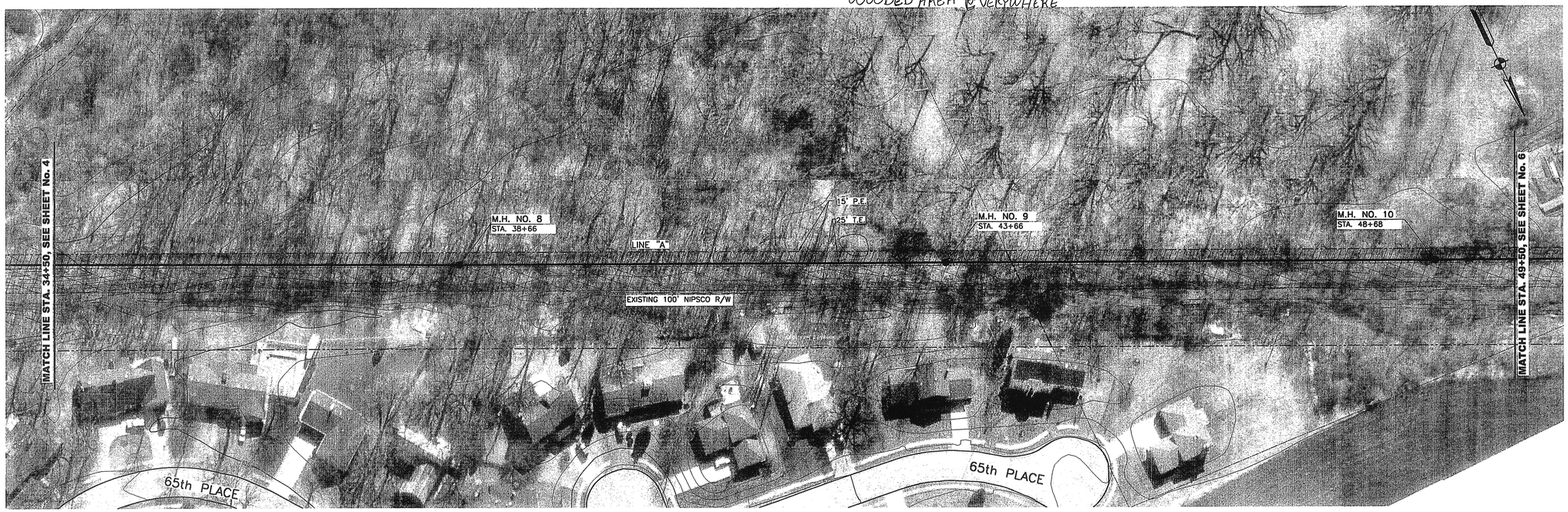
WOODED AREA EVERYWHERE



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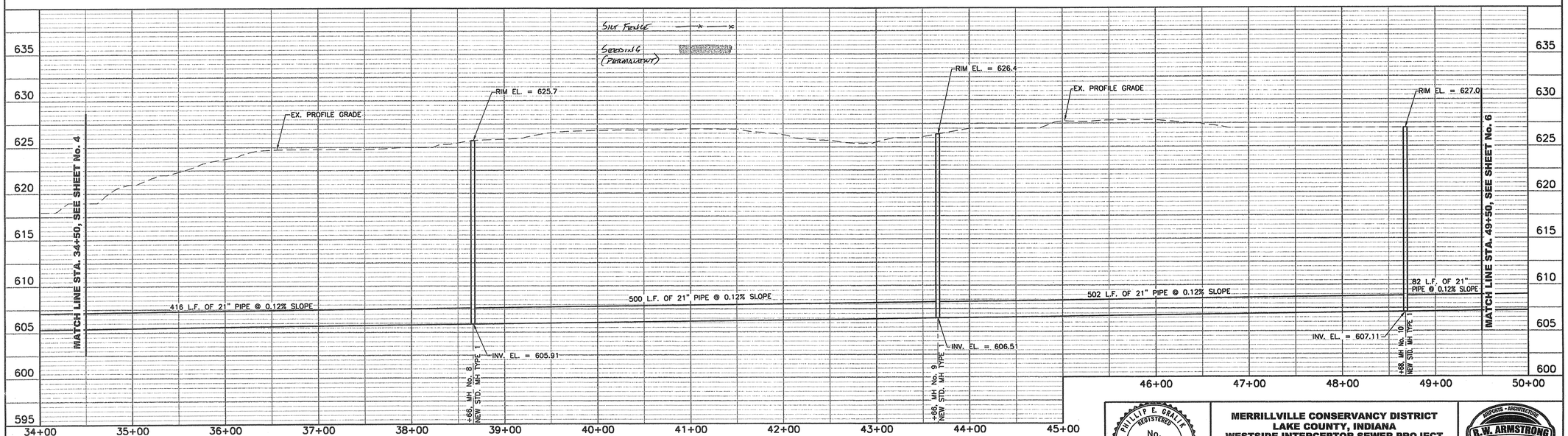

PROFILE

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PHILLIP E. GRALIK REGISTERED No. PE10001134 STATE OF INDIANA PROFESSIONAL ENGINEER

Phillip E. Gralik

MERRILLVILLE CONSERVANCY DISTRICT
LAKE COUNTY, INDIANA
WESTSIDE INTERCEPTOR SEWER PROJECT

PLAN AND PROFILE
LINE "A", STA. 34+50 TO STA. 49+50

JOB NO. 20024530.1	DRAWN RWP/MOB	SCALE: HORIZ.: 1"=50' VERT.: 1"=5'
DATE 8/03	DESIGNED AJS/GLM	APPROVED AJS

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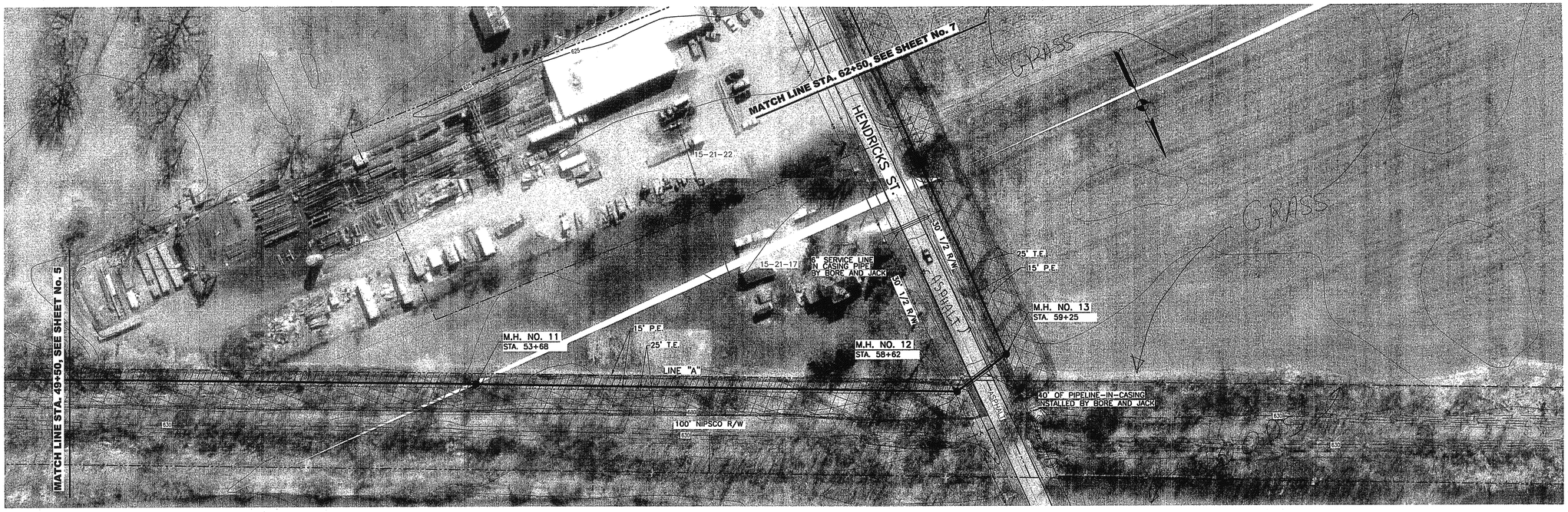

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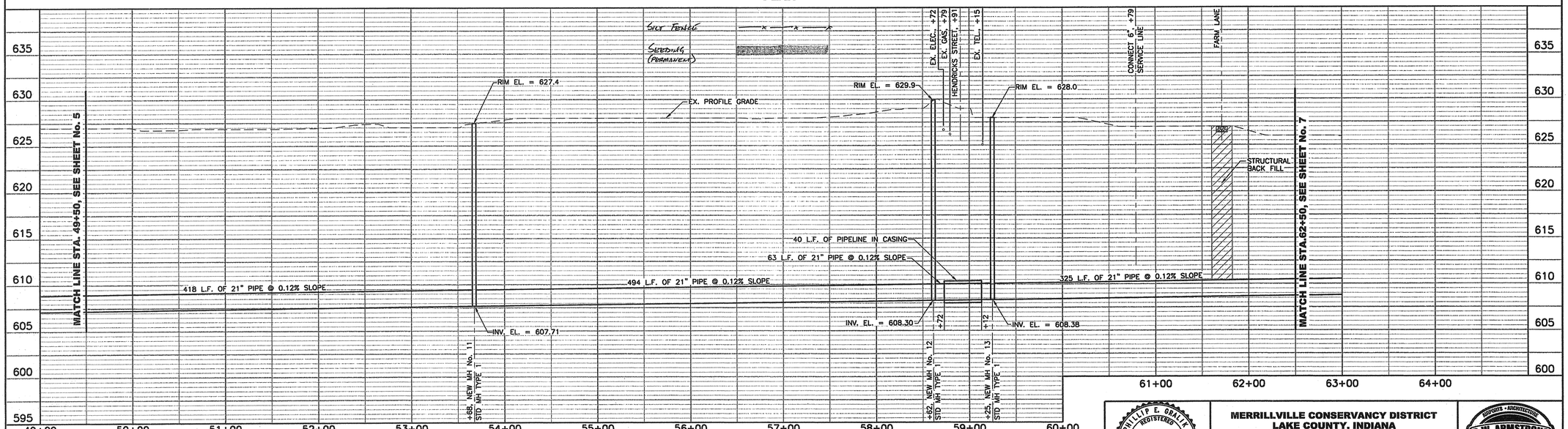

PROFILE

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Phillip E. Gralik

MERRILLVILLE CONSERVANCY DISTRICT
LAKE COUNTY, INDIANA
WESTSIDE INTERCEPTOR SEWER PROJECT

PLAN AND PROFILE
STA. 49+50 TO STA. 62+50

JOB NO. 20024530.1	DRAWN RWP/MOB	SCALE: HORIZ.: 1"=50' VERT.: 1"=5'
DATE 8/03	DESIGNED AJS/GLM	APPROVED AJS

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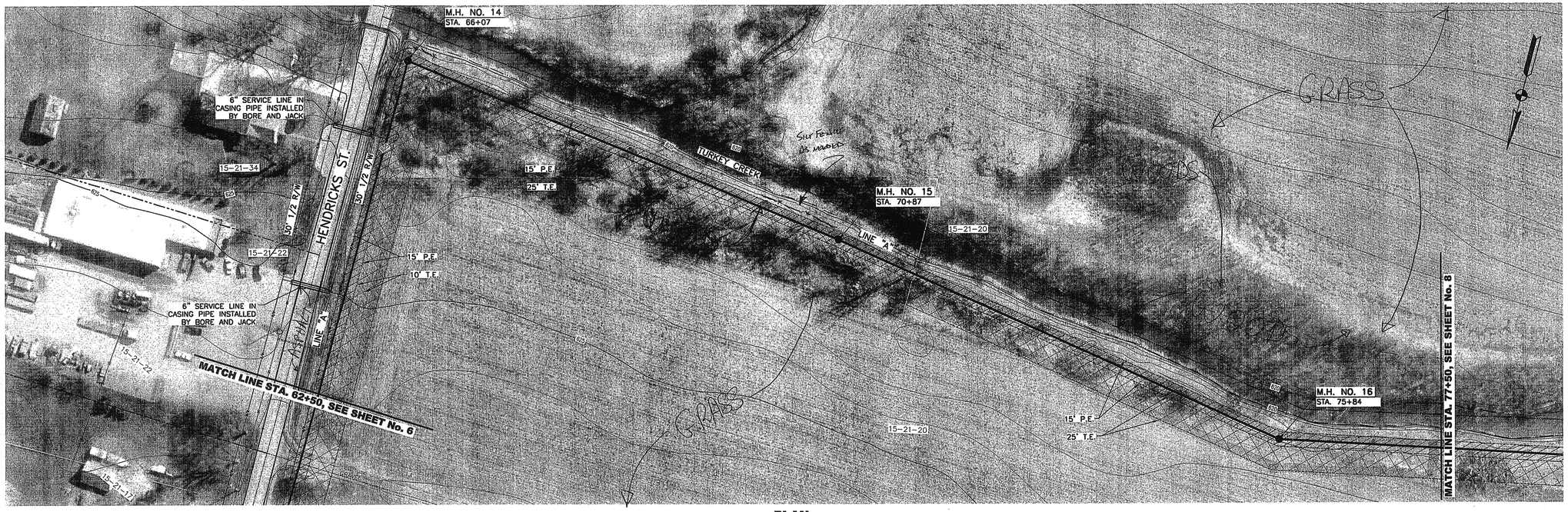
SHEET 6 OF 14



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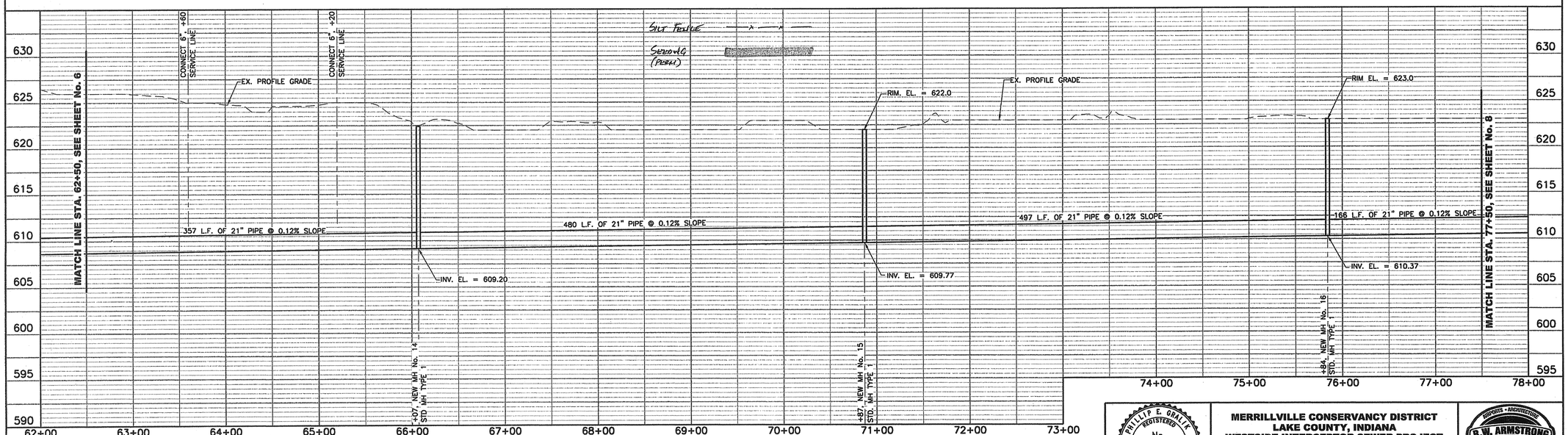

PROFILE

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PHILLIP E. GRALLA REGISTERED No. PE10001134 STATE OF INDIANA PROFESSIONAL ENGINEER

Phillip E. Gralla

MERRILLVILLE CONSERVANCY DISTRICT
LAKE COUNTY, INDIANA
WESTSIDE INTERCEPTOR SEWER PROJECT

PLAN AND PROFILE
STA. 62+50 TO STA. 77+50

JOB NO.	20024530.1	DRAWN	RWP/MOB	SCALE:	HORIZ.: 1"=50' VERT.: 1"=5'		
DATE	8/03	DESIGNED	AJS/GLM	APPROVED	AJS	SHEET	7 OF 14

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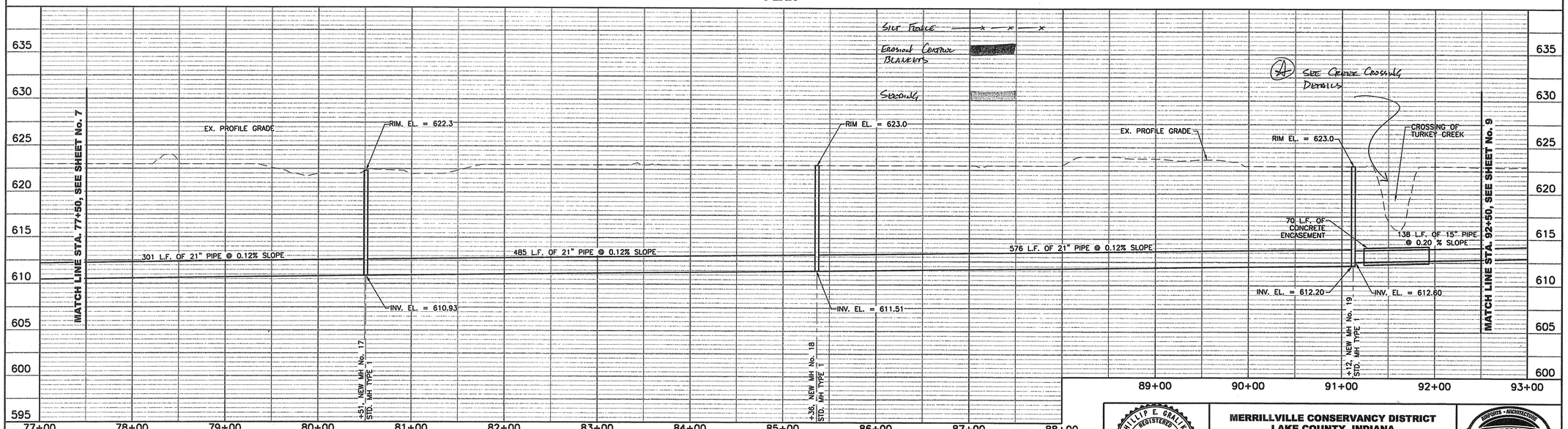
PLAN



Silt Fence

Erosion Control Blankets

Seeding

SEE CREEK CROSSING DETAILS

PROFILE

NO.	DATE	REVISIONS	BY	APPR.
3				
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PHILLIP E. GRALIK REGISTERED No. PE10001134 STATE OF INDIANA PROFESSIONAL ENGINEER

Phillip E. Gralik

MERRILLVILLE CONSERVANCY DISTRICT
LAKE COUNTY, INDIANA
WESTSIDE INTERCEPTOR SEWER PROJECT

PLAN AND PROFILE
STA. 77+50 TO STA. 92+50

JOB NO. 20024530.1	DRAWN RWP/MOB	SCALE: HORIZ.: 1"=50' VERT.: 1"=5'
DATE 8/03	DESIGNED AJS/GLM	APPROVED AJS

SHEET 8 OF 14

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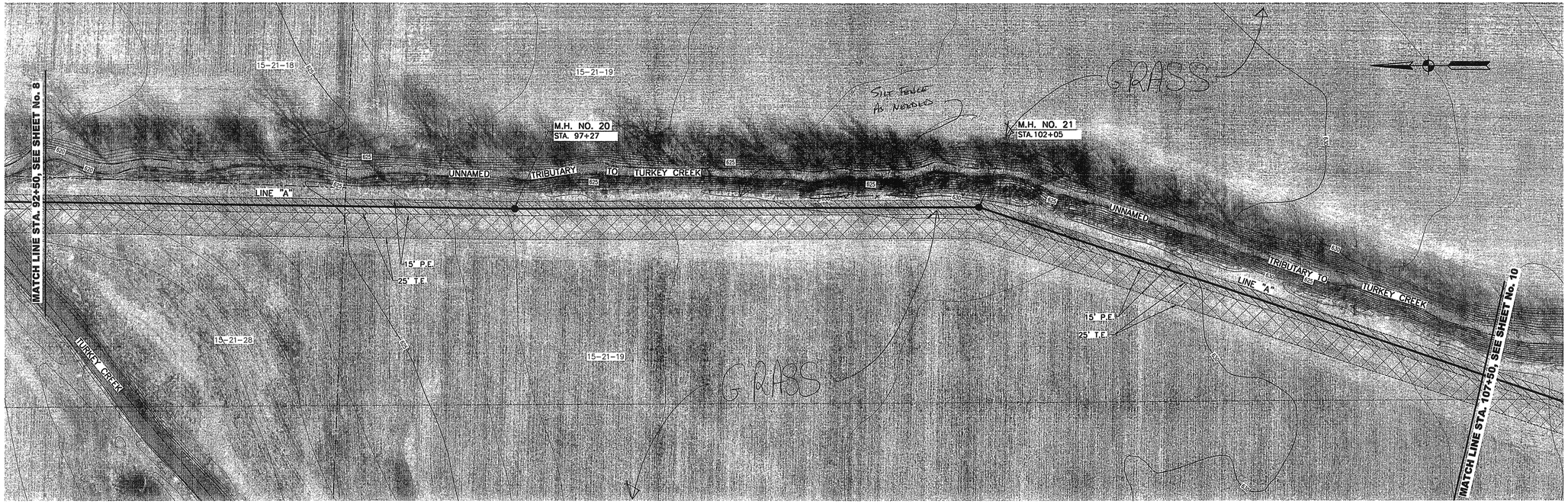

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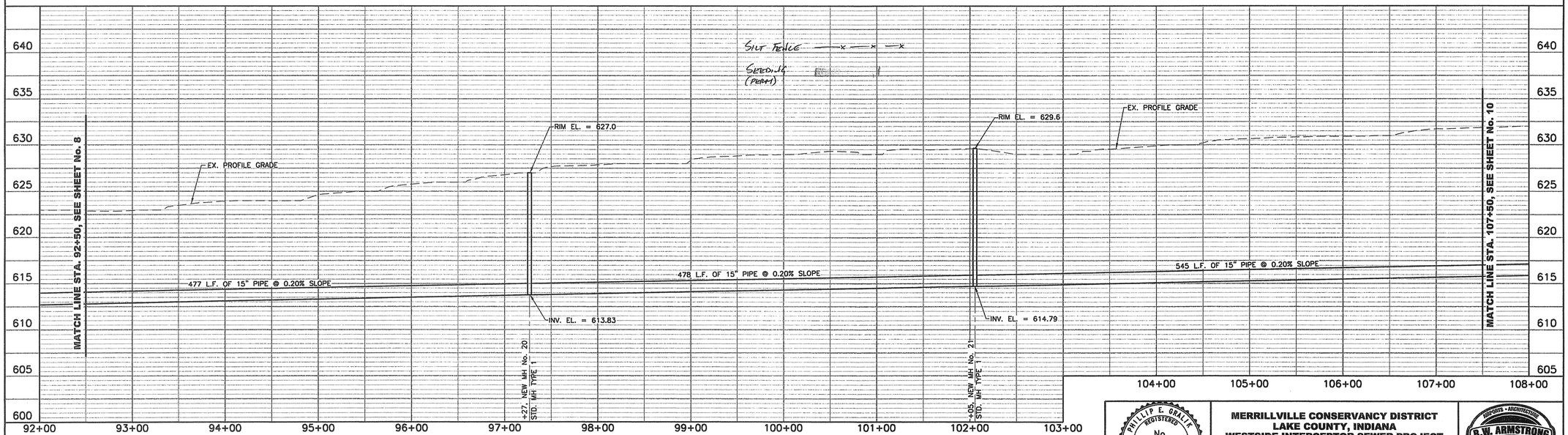

PROFILE

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PHILLIP E. GRALIA REGISTERED No. PE10001134 STATE OF INDIANA PROFESSIONAL ENGINEER

Phillip E. Gralia

MERRILLVILLE CONSERVANCY DISTRICT
LAKE COUNTY, INDIANA
WESTSIDE INTERCEPTOR SEWER PROJECT

PLAN AND PROFILE
STA. 92+50 TO STA. 107+50

JOB NO. 20024530.1	DRAWN RWP/MOB	SCALE: HORIZ.: 1"=50' VERT.: 1"=5'
DATE 8/03	DESIGNED AJS/GLM	APPROVED AJS

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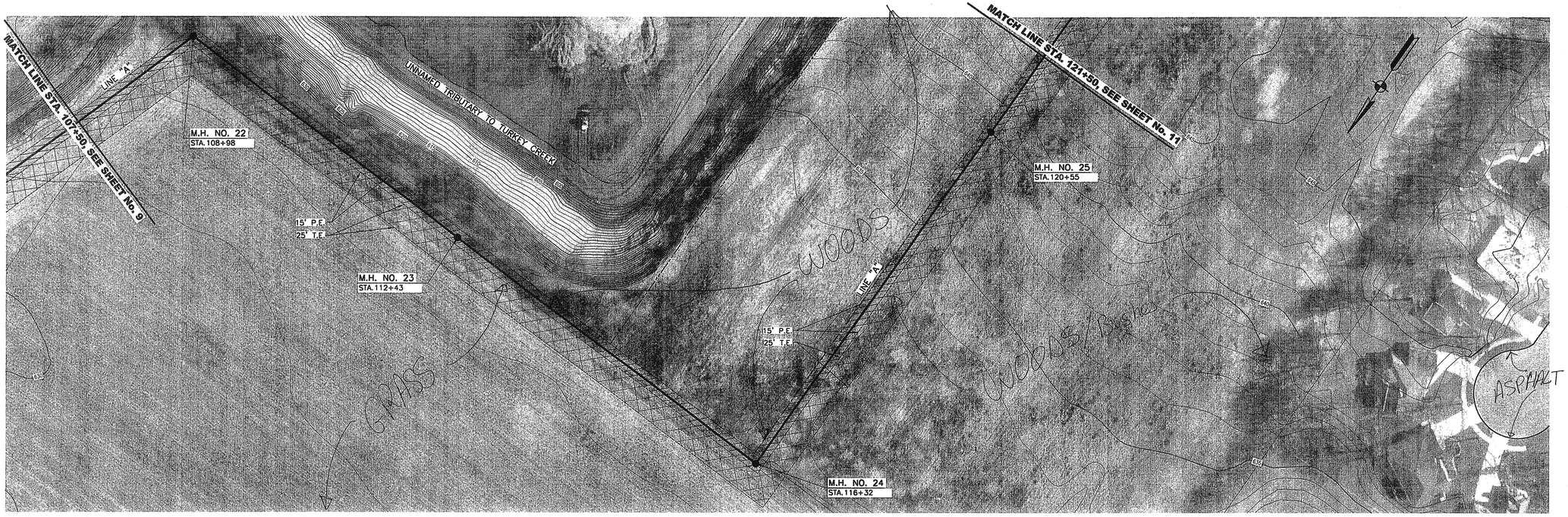
SHEET 9 OF 14



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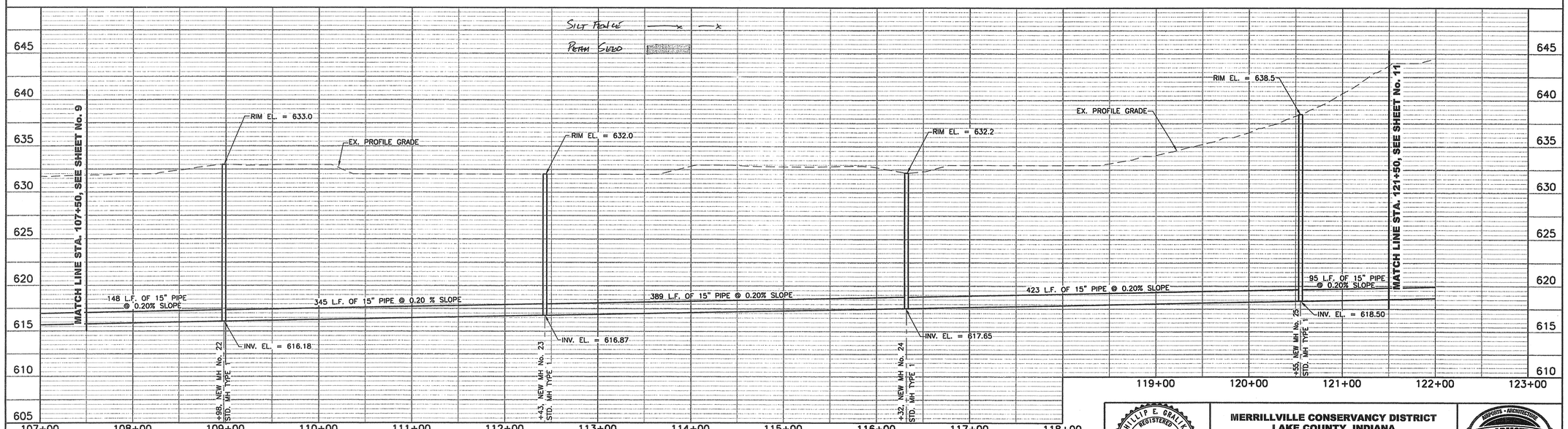

PROFILE

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Phillip E. Gralik

MERRILLVILLE CONSERVANCY DISTRICT
LAKE COUNTY, INDIANA
WESTSIDE INTERCEPTOR SEWER PROJECT

PLAN AND PROFILE
STA. 107+50 TO STA. 121+50

JOB NO. 20024530.1	DRAWN	RWP/MOB	SCALE:	HORIZ.:	1"=50'
				VERT.:	1"=5'
DATE 8/03	DESIGNED	AJS/GLM	APPROVED	AJS	

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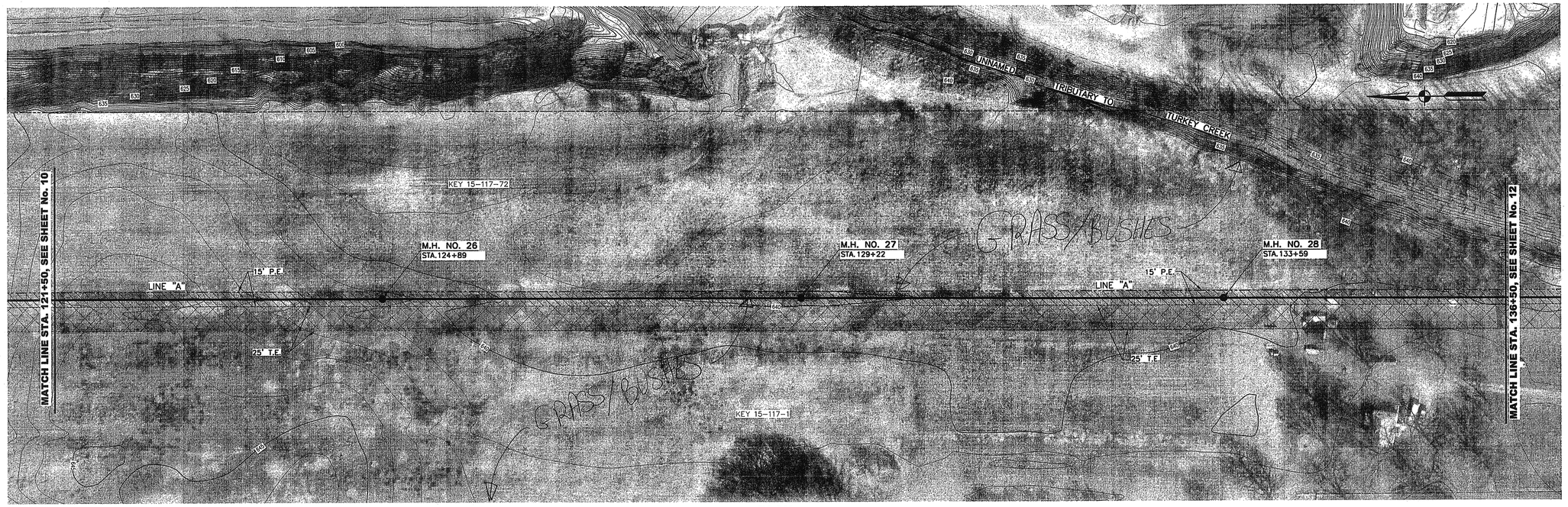

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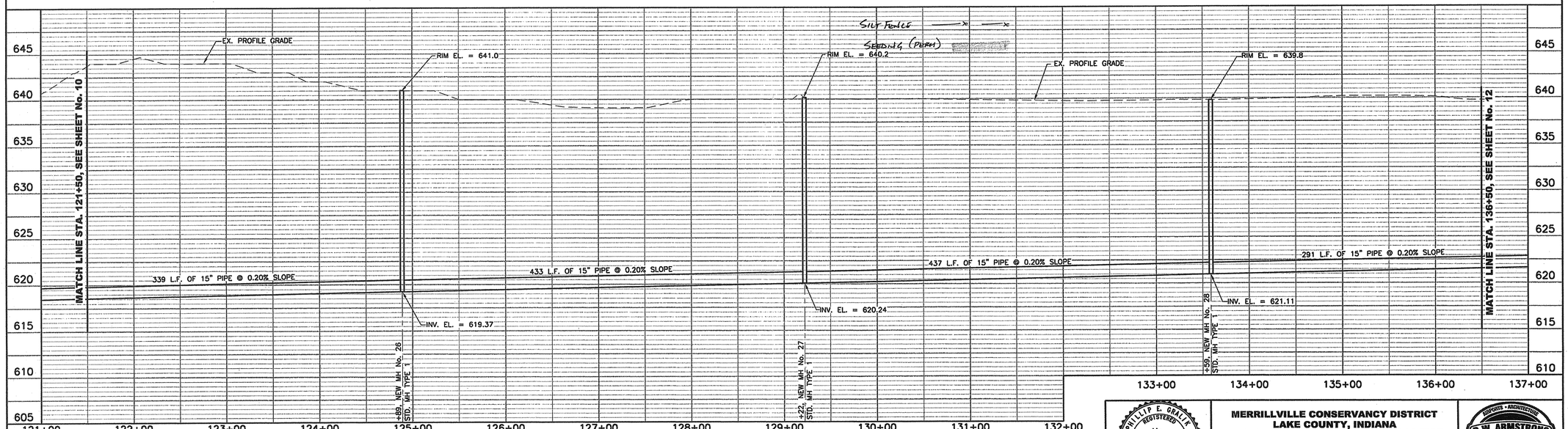

PROFILE

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Phillip E. Gralik

MERRILLVILLE CONSERVANCY DISTRICT
LAKE COUNTY, INDIANA
WESTSIDE INTERCEPTOR SEWER PROJECT

PLAN AND PROFILE
STA. 121+50 TO STA. 136+50

JOB NO. 20024530.1	DRAWN	RWP/MOB	SCALE: HORIZ.: 1"=50' VERT.: 1"=5'
DATE 8/03	DESIGNED	AJS/GLM	APPROVED AJS

R.W. ARMSTRONG
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EST. 1941
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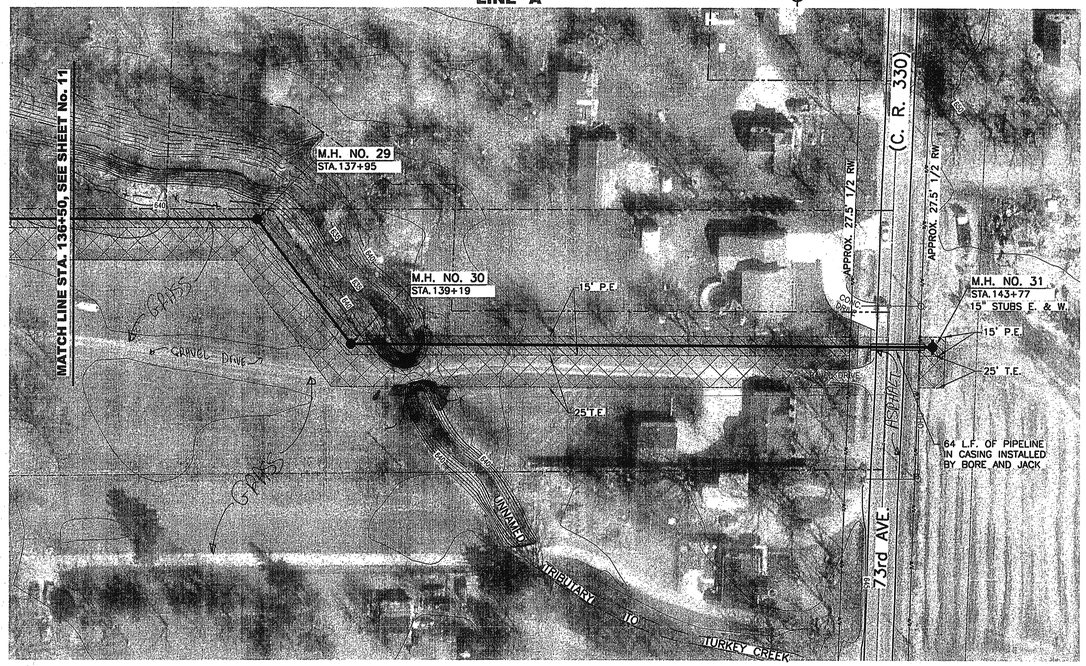
LINE "A"



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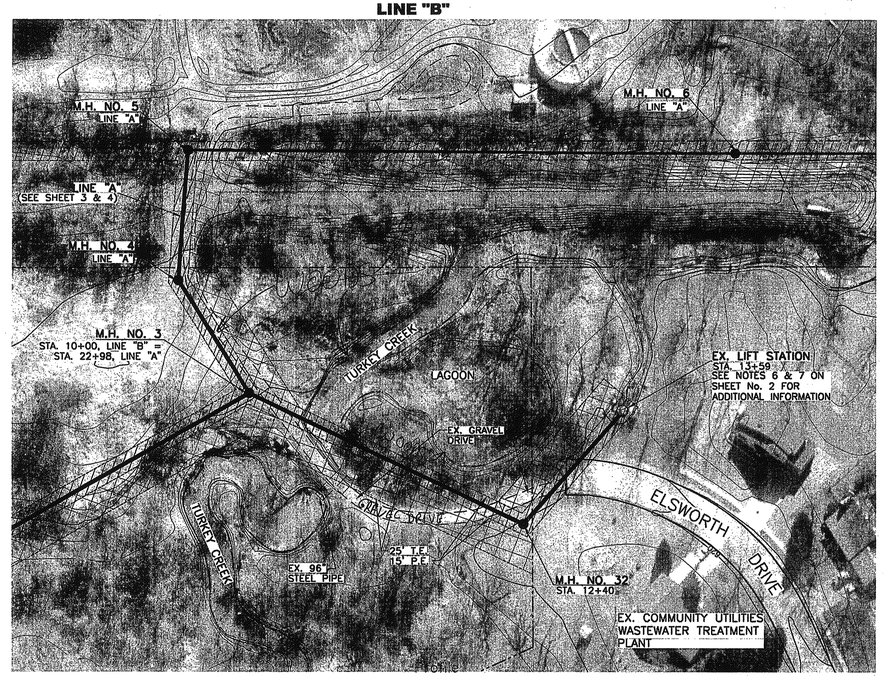
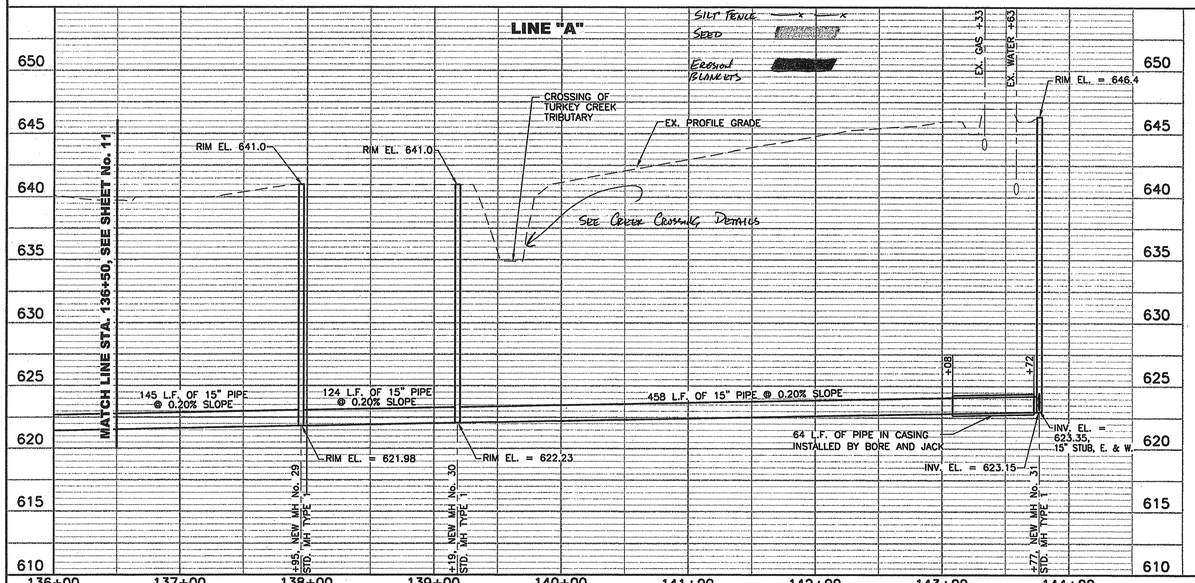


PLAN

LINE "A"



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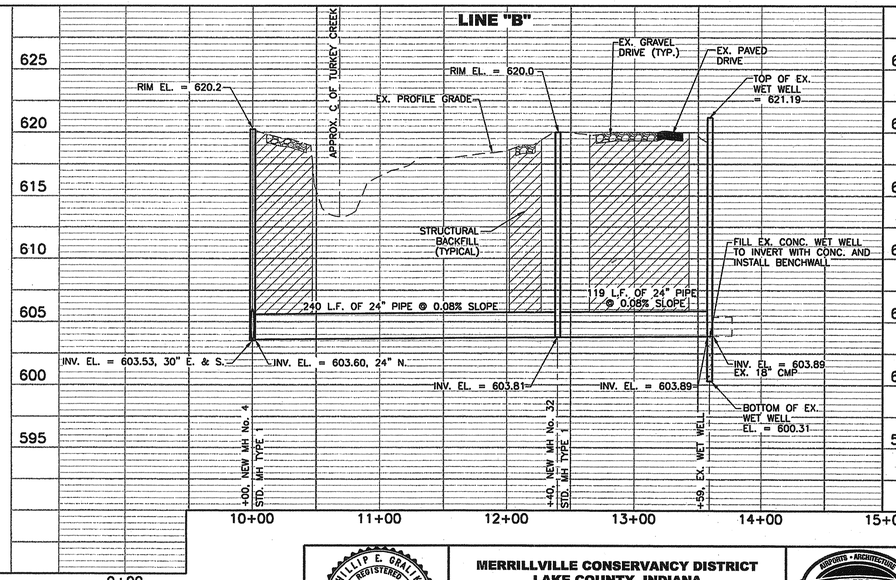

PROFILE

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PHILLIP E. GALIK REGISTERED No. PE10001134 STATE OF INDIANA PROFESSIONAL ENGINEER

MERRILLVILLE CONSERVANCY DISTRICT
LAKE COUNTY, INDIANA
WESTSIDE INTERCEPTOR SEWER PROJECT

PLAN AND PROFILE
LINE "A" - STA. 136+50 TO STA. 143+77 & LINE "B"

JOB NO. 20024530.1	DRAWN RWP/MOB	SCALE: HORIZ.: 1"=50' VERT.: 1"=5'
DATE 8/03	DESIGNED AJS/GLM	APPROVED AJS

R.W. ARMSTRONG
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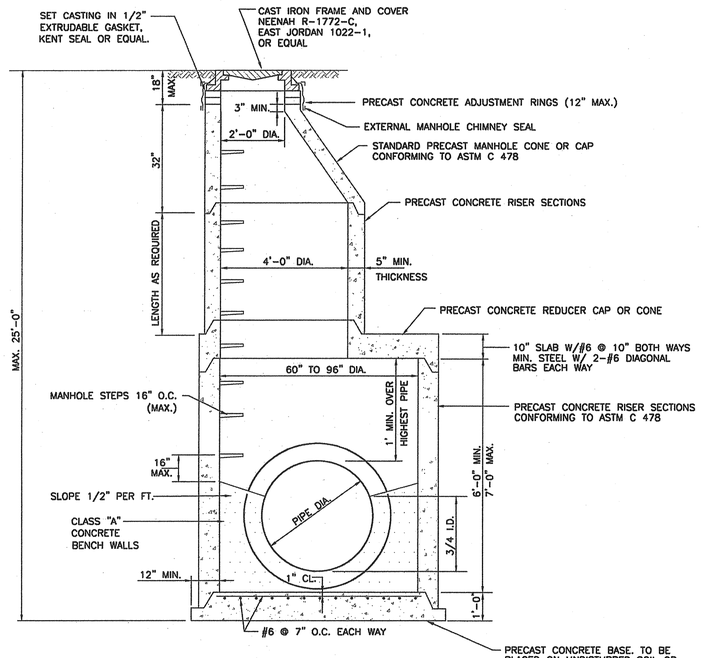
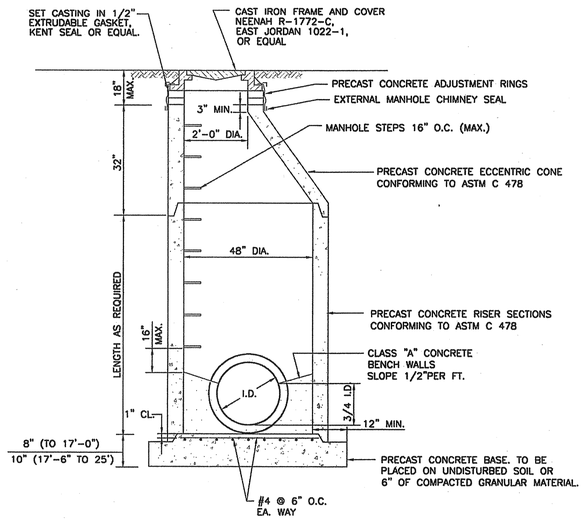


STANDARD PRECAST CONCRETE MANHOLE - TYPE 2

SEE TABLE FOR MAXIMUM INSIDE DIAMETER FOR CONNECTING SEWER
NOT TO SCALE

TYPE 2

INSIDE MANHOLE DIAMETER, INCHES	SEWER PIPE DEFLECTION THROUGH MANHOLE, DEGREES	TYPE OF SEWER PIPE		
		PVC	DI/ FIBER	
60"	0' – 45'	36"	36"	
60"	46' – 90'	27"	24"	
72"	0' – 45'	42"	42"	
72"	46' – 90'	30"	30"	
84"	0' – 45'	48"	48"	
84"	46' – 90'	36"	36"	
96"	0' – 45'	42"	42"	
96"	46' – 90'	48"	48"	

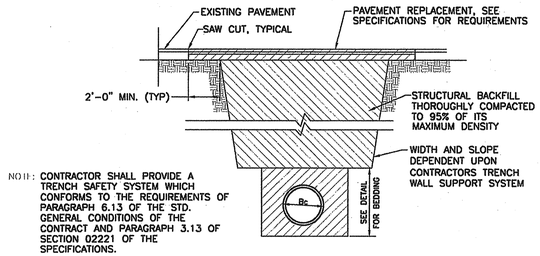


STANDARD PRECAST CONCRETE MANHOLE - TYPE 1

SEE TABLE FOR MAXIMUM INSIDE DIAMETER FOR CONNECTING SEWER
NOT TO SCALE

TYPE 1

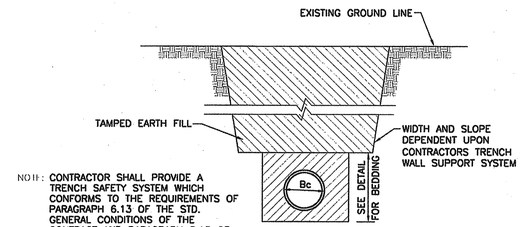
INSIDE MANHOLE DIAMETER, INCHES	SEWER PIPE DEFLECTION THROUGH MANHOLE, DEGREES	TYPE OF SEWER PIPE		
		PVC	DI/ FIBER	
48"	0' – 45'	27"	24"	
48"	46' – 90'	21"	20"	



NOTE: CONTRACTOR SHALL PROVIDE A TRENCH SAFETY SYSTEM WHICH CONFORMS TO THE REQUIREMENTS OF PARAGRAPH 6.13 OF THE STD. GENERAL CONDITIONS OF THE CONTRACT AND PARAGRAPH 3.13 OF SECTION 02221 OF THE SPECIFICATIONS.

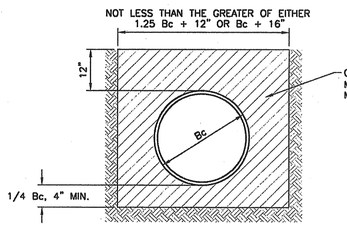
TRENCH AND BACKFILL UNDER PAVEMENT DETAIL AND OTHER LOCATIONS*

* AS SPECIFIED IN SECTION 02221 OF THE SPECIFICATIONS OR WHERE STRUCTURAL BACKFILL IS REQUIRED BY PLANS.



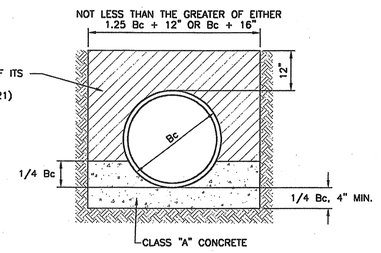
NOTE: CONTRACTOR SHALL PROVIDE A TRENCH SAFETY SYSTEM WHICH CONFORMS TO THE REQUIREMENTS OF PARAGRAPH 6.13 OF THE STD. GENERAL CONDITIONS OF THE CONTRACT AND PARAGRAPH 3.13 OF SECTION 02221 OF THE SPECIFICATIONS.

TRENCH AND BACKFILL DETAIL



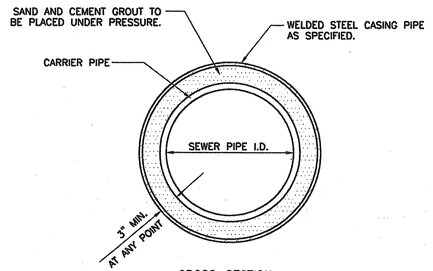
NOTE: IN ROCK TRENCH, EXCAVATE AT LEAST 6" BELOW THE BELL OF THE PIPE.

STANDARD BEDDING



CONCRETE CRADLE

BEDDING DETAILS



CROSS-SECTION

PIPE IN CASING

NO.	DATE	REVISIONS	BY	APPR.
3				
2				
1				

PHILLIP E. GRALIK REGISTERED No. PE10001134 STATE OF INDIANA PROFESSIONAL ENGINEER

MERRILLVILLE CONSERVANCY DISTRICT
LAKE COUNTY, INDIANA
WESTSIDE INTERCEPTOR SEWER PROJECT

MISCELLANEOUS DETAILS

JOB NO. 20024530.1	DRAWN		SCALE:	AS NOTED
DATE 8/03	DESIGNED	AJS/GLM	APPROVED	AJS

SHEET 13 OF 14

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2801 S. PENNSYLVANIA STREET
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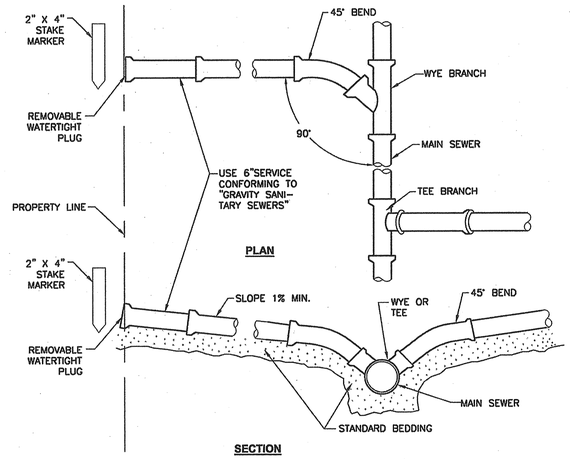
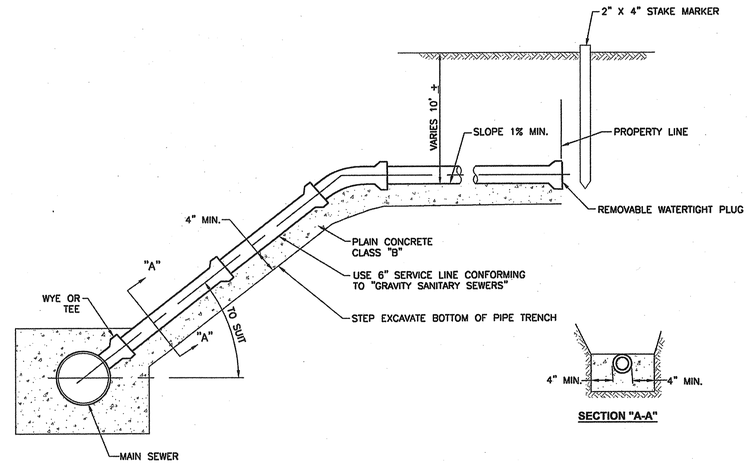
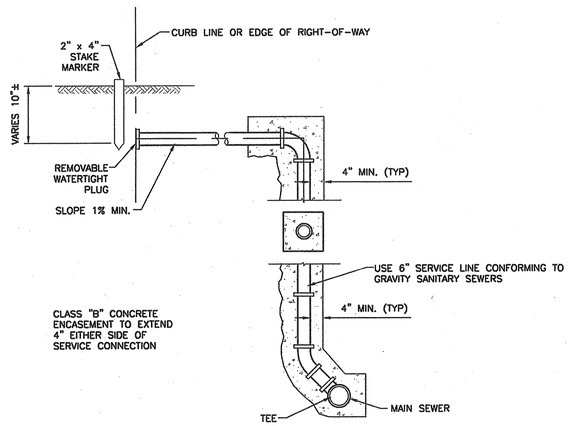


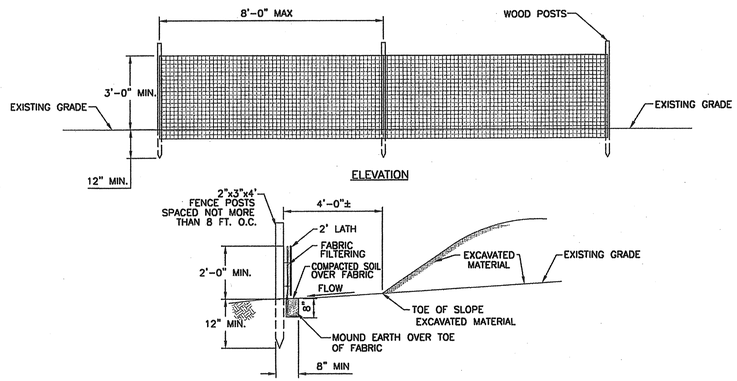
SERVICE CONNECTION - SHALLOW



SERVICE CONNECTION - DEEP



SERVICE CONNECTION - DEEP
(LIMITED R/W ONLY)



UNSUPPORTED SILT FENCE TYPE A
NOT TO SCALE

NO.	DATE	REVISIONS	BY	APPR.
3				
2				
1				

PHILLIP E. GRALIK REGISTERED No. PE10001134 STATE OF IND LAND PROFESSIONAL ENGINEER

MERRILLVILLE CONSERVANCY DISTRICT
LAKE COUNTY, INDIANA
WESTSIDE INTERCEPTOR SEWER PROJECT

MISCELLANEOUS DETAILS

JOB NO. 20024530.1		DRAWN		SCALE:	AS NOTED
DATE	8/03	DESIGNED	AJS/GLM	APPROVED	AJS

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APPENDIX M

MODELING ANALYSIS

CDM

Memorandum

To: *James M. Czarnik, Senior Engineer*
Robinson Engineering

From: *Mandeera Wagle, Project Manager*
Matt Rembold, Project Engineer
CDM

Date: *November 15, 2010*

Subject: *Taft Street Lift Station Analysis*

The Merrillville Conservancy District (MCD) owns and operates the Taft Street Lift Station, which is located near the intersection of 63rd Avenue and State Road 55, in Merrillville, Indiana. The lift station consists of a wet well, four pumps, and two forcemains that operate under pumped conditions only (i.e., the forcemains do not flow by gravity in case the pumps are off). Based on information provided by Robinson Engineering, the lift station currently pumps approximately 3.2 MGD average daily flow and 10 MGD peak flow, although flows through the lift station have been known to reach 12 MGD. MCD has plans to expand the station to a capacity of 25 MGD in the next few months.

Over the weekend of October 15th through the 17th, 2010, it is believed that a compressor in the lift station failed, preventing the pumps from operating and causing the water level in the station to rise significantly. High water marks were found within the wet well at approximately 615 feet, 25 feet above the elevation of the bottom slab of the lift station. Subsequent to the lift station failure, a fish kill in nearby Turkey Creek occurred.

Robinson Engineering engaged CDM to perform a static analysis of the Taft Street Lift Station to estimate the degree and extent of sewer system surcharging under various flow scenarios, including a pump station failure condition. This memorandum summarizes the methodology and results of the analysis, and contains the following sections:

- Model Development
- Simulated Scenarios
- Results and Conclusions

Section 1: Model Development

The analysis of the Taft Street Lift Station was based on a computer model of the sewer system immediately upstream of the lift station. Based on the objective of this analysis, the model extents were limited to the area containing manholes with rim elevations just at the 615 foot high water elevation. Figure 1 presents the study area and model extents. The study area is bounded by 59th Place to the north, Cleveland Circle to the east, and the future Prairie Creek development to the south and west. Based on information provided by Robinson Engineering, the sewers within the study area range from 8 inches to 48 inches in diameter, with the main Taft Street interceptor being 48 inches in diameter. On average, the system is approximately 12 feet below grade.

The model was developed based on AutoCAD drawings (XR-Sewers.dwg and Master.dwg) provided by Robinson Engineering. Spatial referencing and pipe and manhole attribute information was converted from these AutoCAD drawings first to ArcGIS and then imported to a SWMM-based modeling software package. The following attribute information was required to develop the model:

- Manholes: x-coordinate, y-coordinate, rim elevation, invert elevation
- Pipes: upstream and downstream invert elevation, diameter, pipe length

All attribute information was populated using the AutoCAD maps provided. It was assumed that the coordinate system of the AutoCAD drawings is North American Datum (NAD) 1983 State Plane Indiana West, in units of feet. Missing rim elevations were estimated using a publically available 10-meter digital elevation model (DEM), and missing invert elevations were estimated based on slope. If a slope could not be determined based on information provided on the source AutoCAD drawings then minimum slopes as provided by the Indiana Administrative Code, Title 327 Water Pollution Control Board 327 IAC 3-6-12 were used. All pipes were assumed to be circular in shape with a Manning's n of 0.013.

Because the analysis focused on a pump station failure condition, and because the forcemains from the lift station cannot flow under gravity conditions, the downstream boundary of the model was the Taft Street Lift Station wet well. The wet well was modeled as a storage node, based on the existing footprint (as shown on the provided AutoCAD drawings) and inverts (as shown on the Taft Street Lift Station Expansion to 25 MGD D-5 Section A drawing) with an outlet that prevented any flow from leaving the lift station.

It should be noted that for the purposes of this analysis, only the hydraulic network of the sewer system was built in to the model. Hydrology (i.e., sewersheds and associated

attributes,) and any impacts from inflow and infiltration was not required for the analysis and therefore was not included in the model.

Simulated Scenarios

The model was used to evaluate three flow scenarios. The main scenario of interest was the flow condition that was occurring in the system during the weekend of the reported lift station failure. During this weekend, there was no rainfall, and the average daily dry weather flow of 3.2 MGD was assumed to have occurred through the system. Two additional flow scenarios, with 10 MGD peak flow and 12 MGD extreme flows, were also evaluated.

Flows were input as a direct, constant inflow at the wet well of the Taft Street Lift Station. System flows were then simulated over the October 14 through 20, 2010 period under static conditions (i.e., with no variability to the flow input). The model was used to analyze peak water level at the wet well, peak hydraulic grade line through the system, and any flooded manholes.

Results and Conclusions

For all three simulated scenarios (3.2 MGD, 10 MGD, and 12 MGD flows), the model predicted only three manholes to flood. The three manholes are located in the vicinity of where the 36 inch diameter east-west aligned sewer just south of Turkey Creek enters the main north-south interceptor at Taft Street (see Figure 1). The peak level in the wet well was predicted to be approximately 617 feet for all three modeled scenarios. These results are in agreement with field investigations reported by Robinson Engineering, which indicated that the water level in the wet well reached approximately 615 feet, and flooding occurred at the same three manholes.

For all three simulated scenarios, the entire modeled system exhibited surcharged conditions to varying degrees (i.e., the peak hydraulic grade line was higher than the crown of the pipe). Figure 1 indicates portions of the system where the freeboard between the ground surface and the peak hydraulic grade line in the pipes is at least 8 feet. Figures 3 through 30 present profiles of various sections of the sewer system indicating the peak hydraulic grade line through that segment during the 3.2 MGD constant inflow / lift station failure scenario.

The results of this analysis indicate that for a lift station failure condition, it is likely that during average dry weather system flow conditions of 3.2 MGD the sewer system upstream of the Taft Street Lift Station will surcharge to varying degrees and manholes in the vicinity of Turkey Creek will flood to the ground surface.

Taft Street Lift Station Analysis

Figure 1: Extent of Surcharging for 3.2 MGD Constant Flow / Pump Failure Scenario

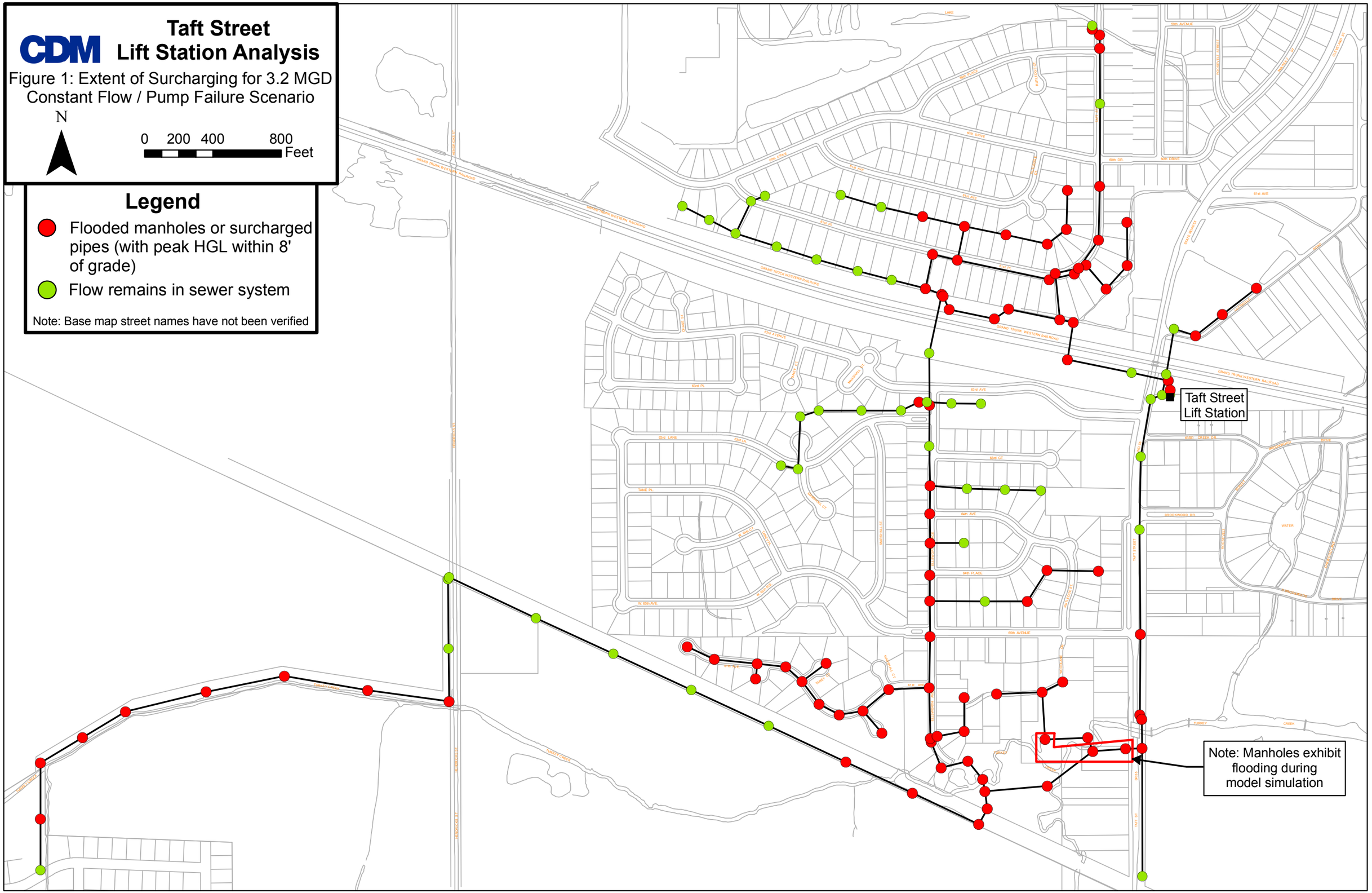
N

0 200 400 800 Feet

Legend

- Flooded manholes or surcharged pipes (with peak HGL within 8' of grade)
- Flow remains in sewer system

Note: Base map street names have not been verified



Taft Street Lift Station Analysis

Figure 2: Profile Index

N

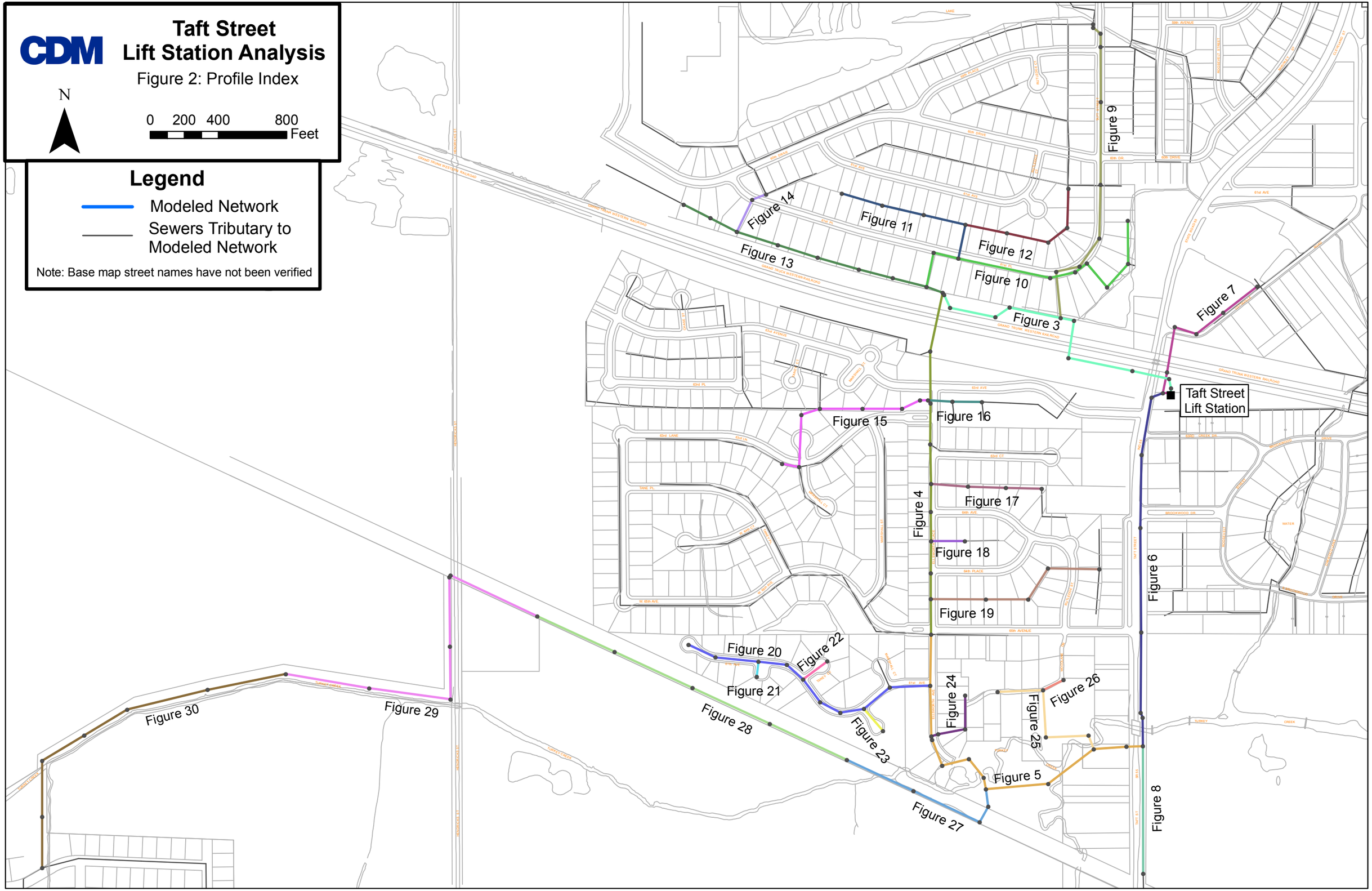
0 200 400 800 Feet

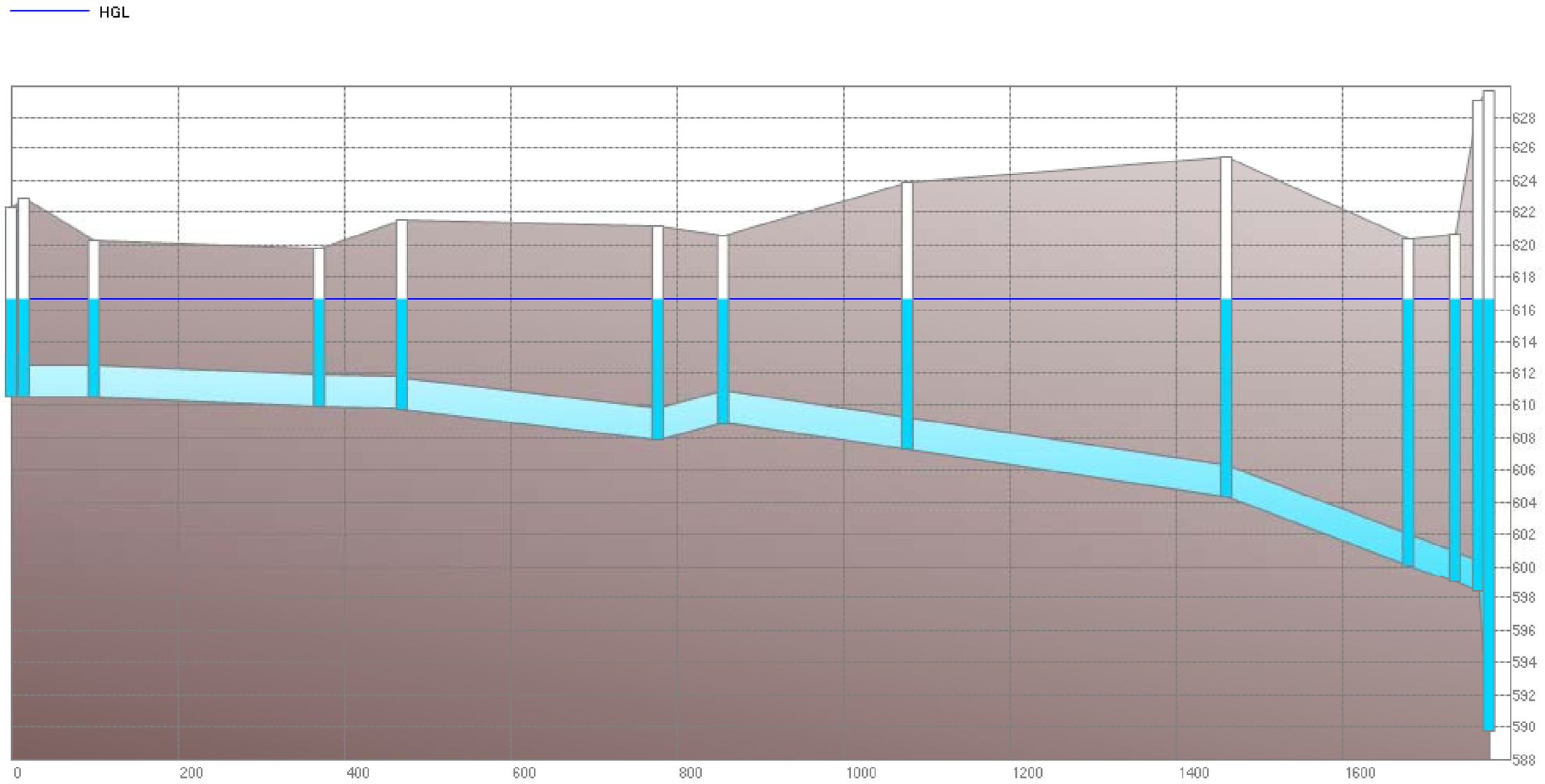
Legend

Modeled Network

Sewers Tributary to Modeled Network

Note: Base map street names have not been verified

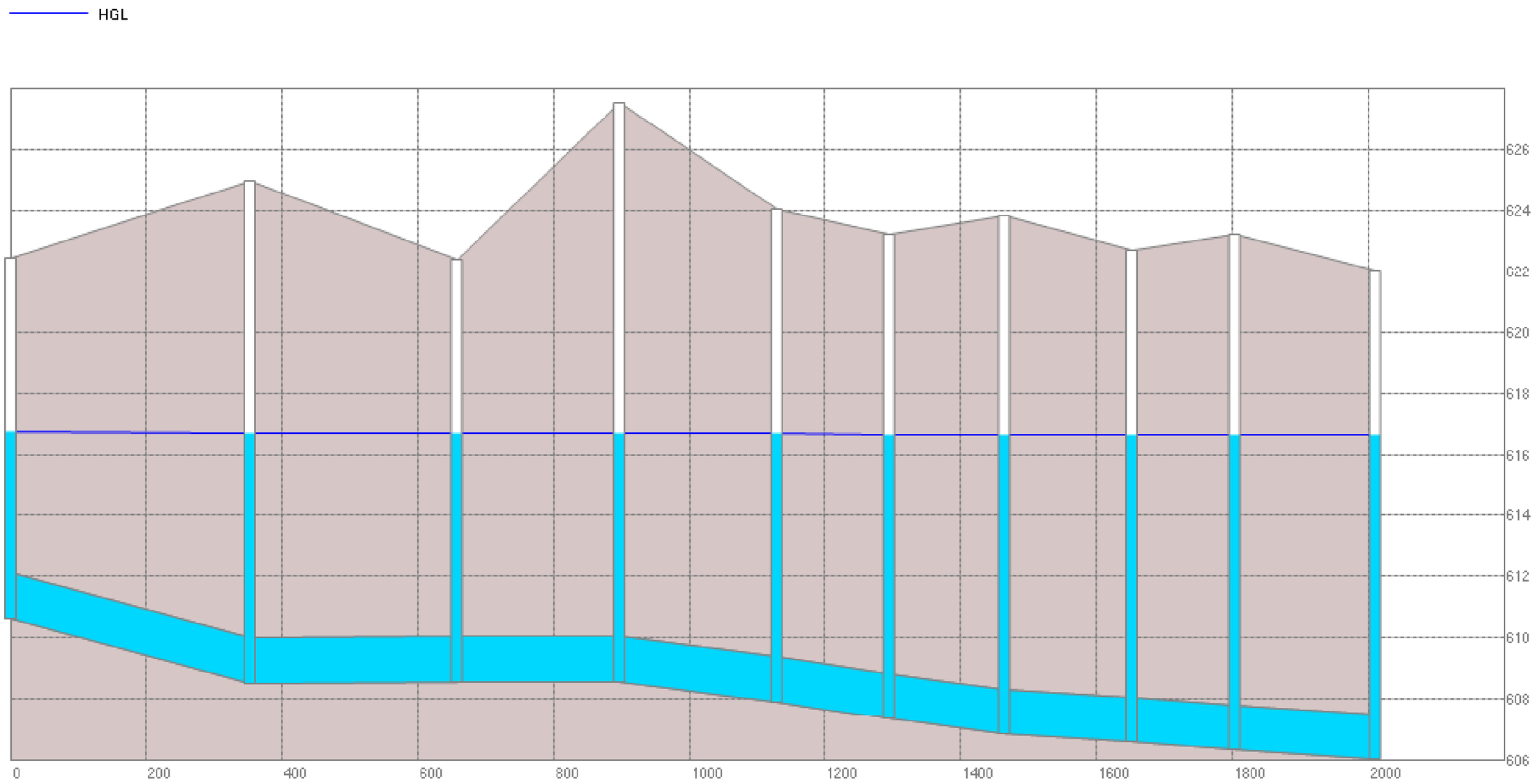




CDM

Taft Street Lift Station Analysis
Peak Hydraulic Grade Line for 3.2 MGD Constant Flow / Pump Failure Scenario

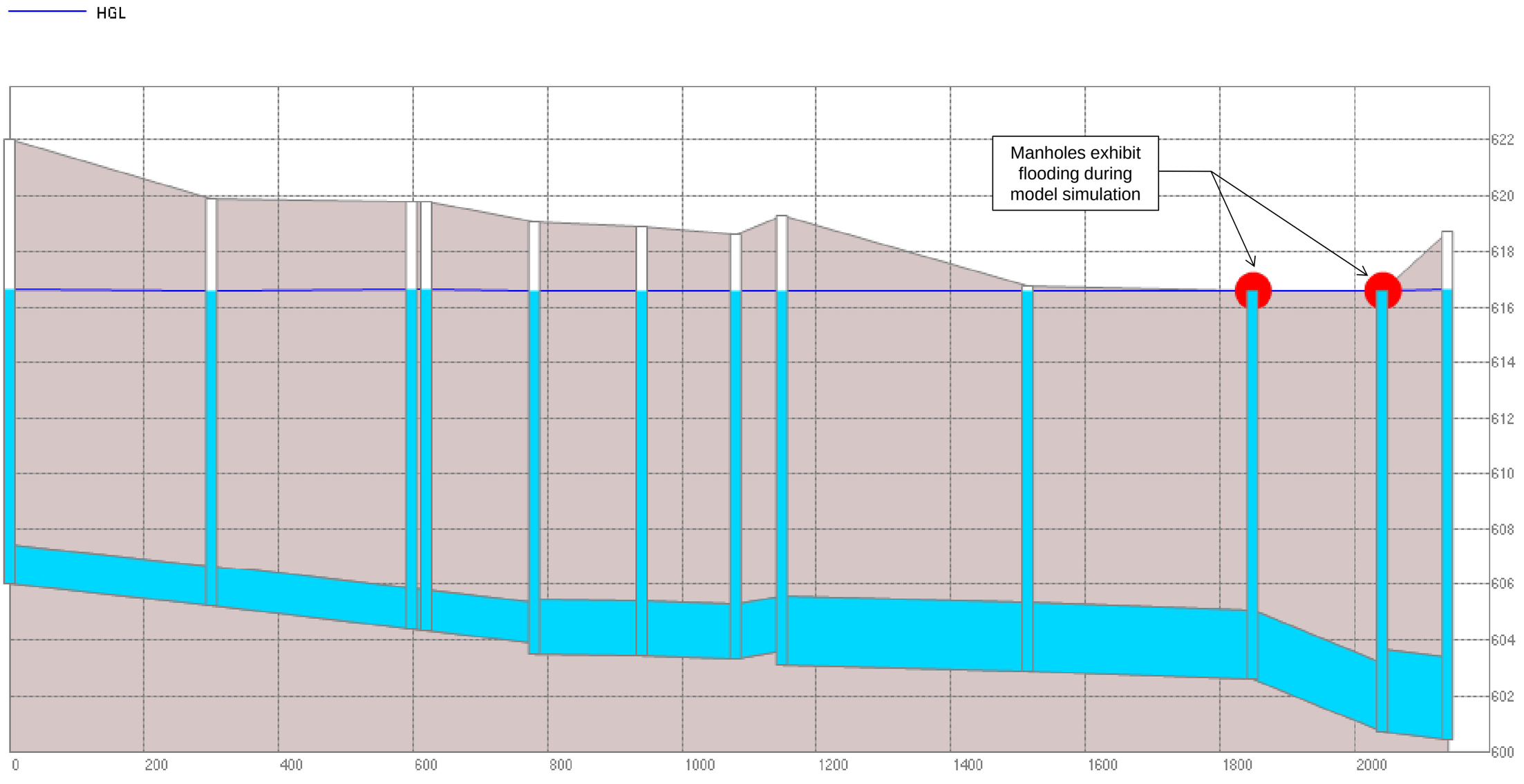
Figure 3
Adjacent to Grand Truck Western Railroad to Lift Station (2-4’ Dia.)



CDM

Taft Street Lift Station Analysis
Peak Hydraulic Grade Line for 3.2 MGD Constant Flow / Pump Failure Scenario

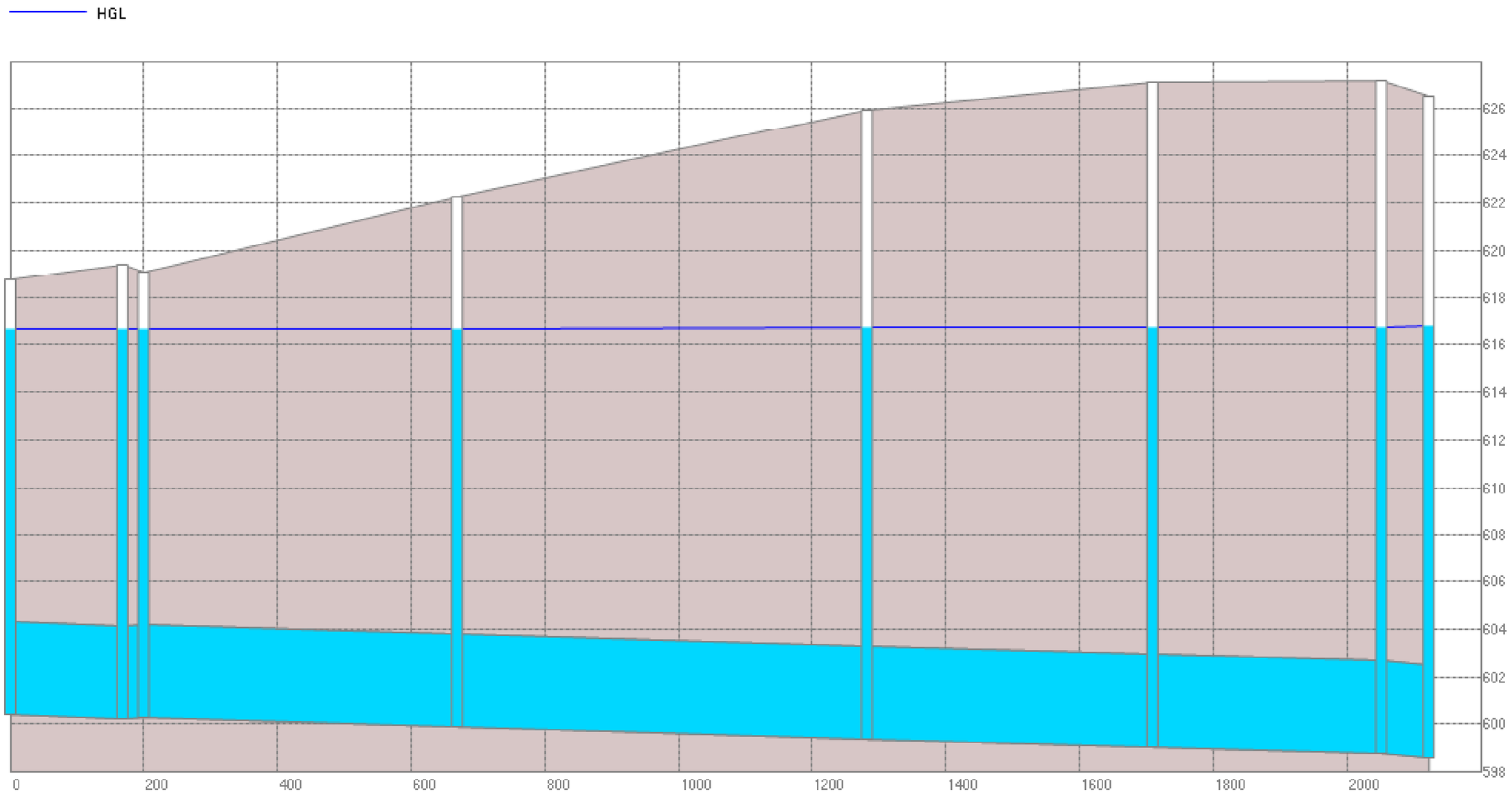
Figure 4
Ellsworth Place from Railroad to 65th Avenue (1.5' Dia.)



CDM

Taft Street Lift Station Analysis
Peak Hydraulic Grade Line for 3.2 MGD Constant Flow / Pump Failure Scenario

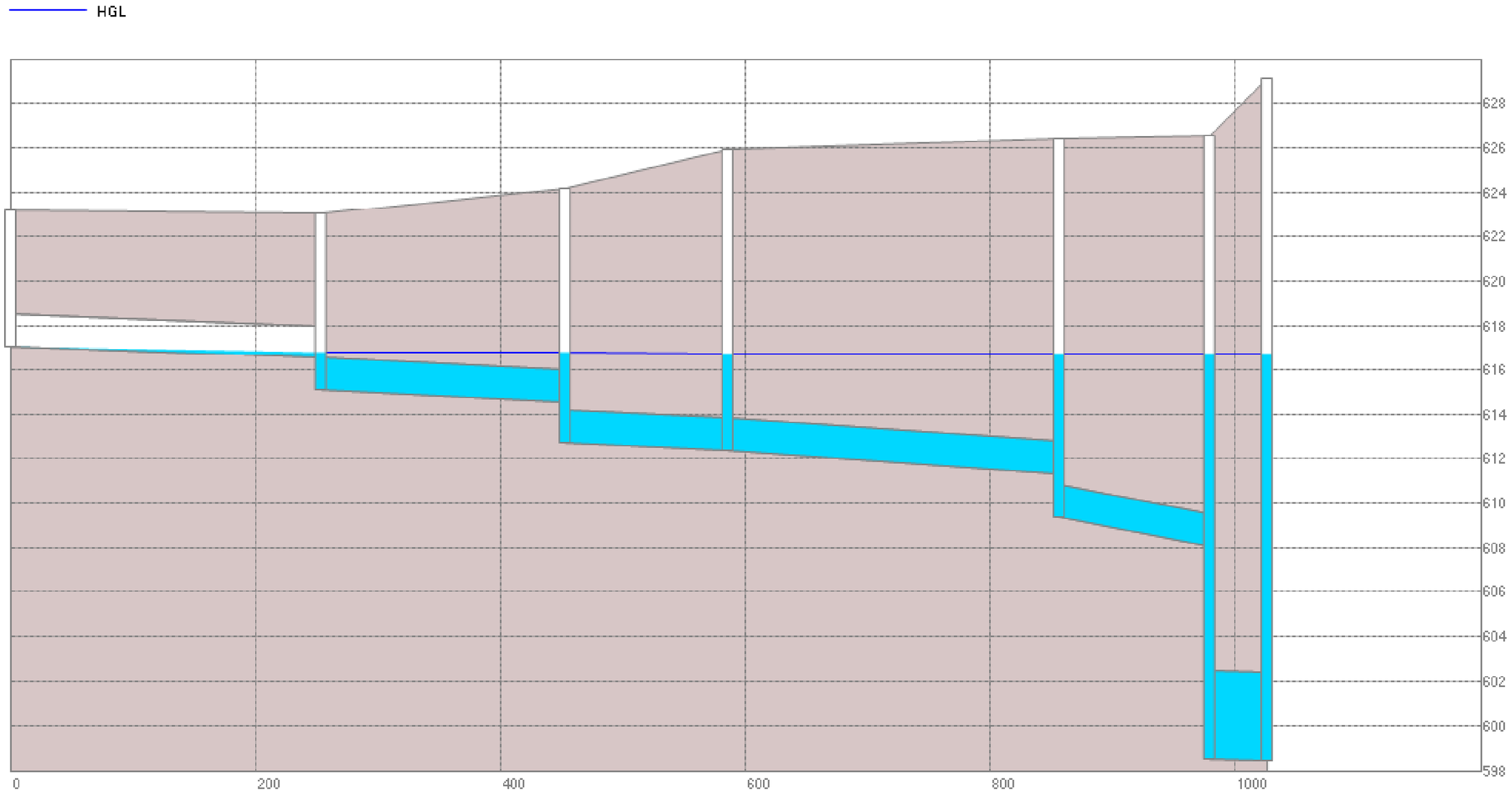
Figure 5
Ellsworth Place from 65th Avenue to Taft Street (1.5-3' Dia.)



CDM

Taft Street Lift Station Analysis
Peak Hydraulic Grade Line for 3.2 MGD Constant Flow / Pump Failure Scenario

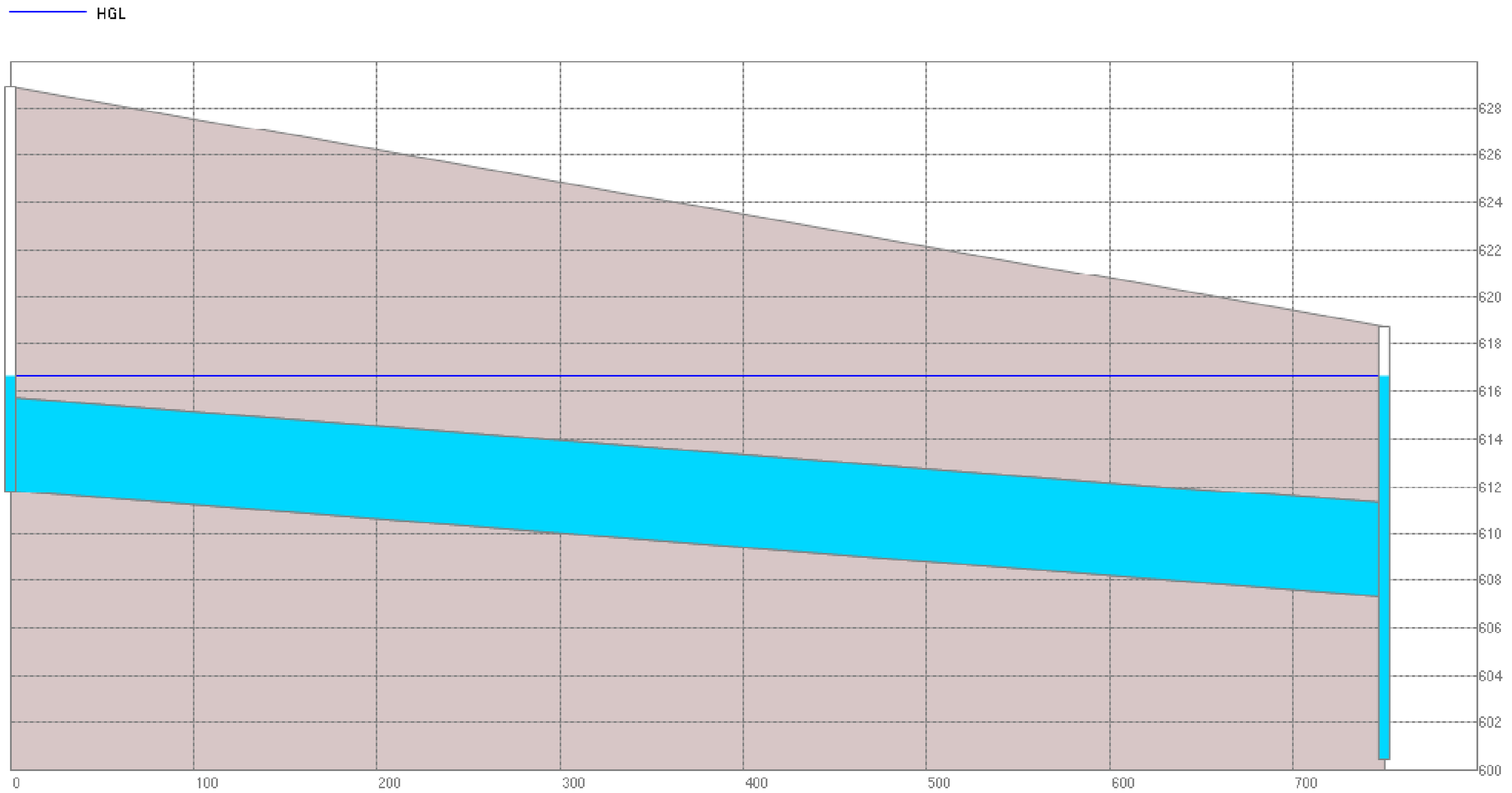
Figure 6
Taft Street from Turkey Creek to Lift Station (4’ Dia.)



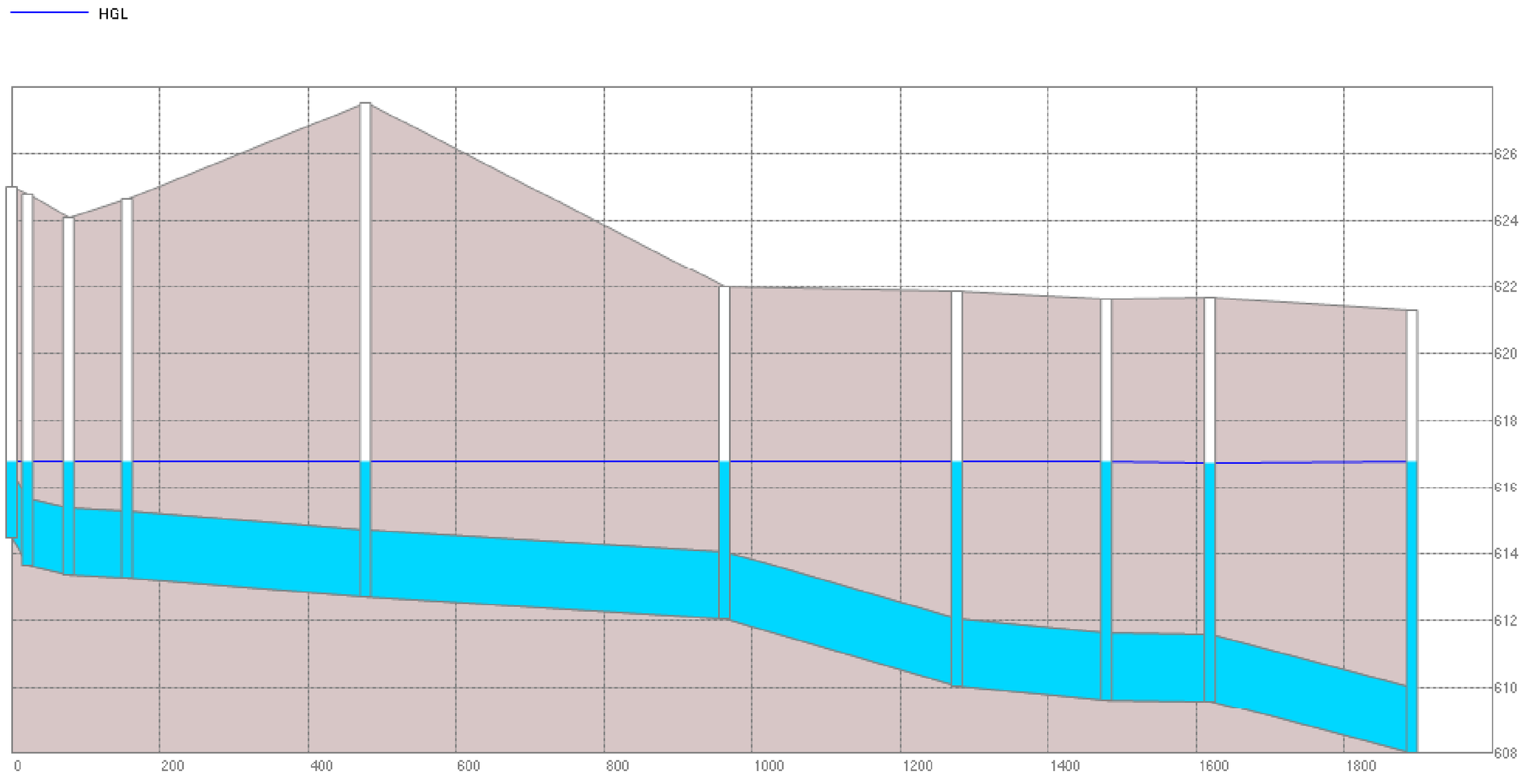
CDM

Taft Street Lift Station Analysis
Peak Hydraulic Grade Line for 3.2 MGD Constant Flow / Pump Failure Scenario

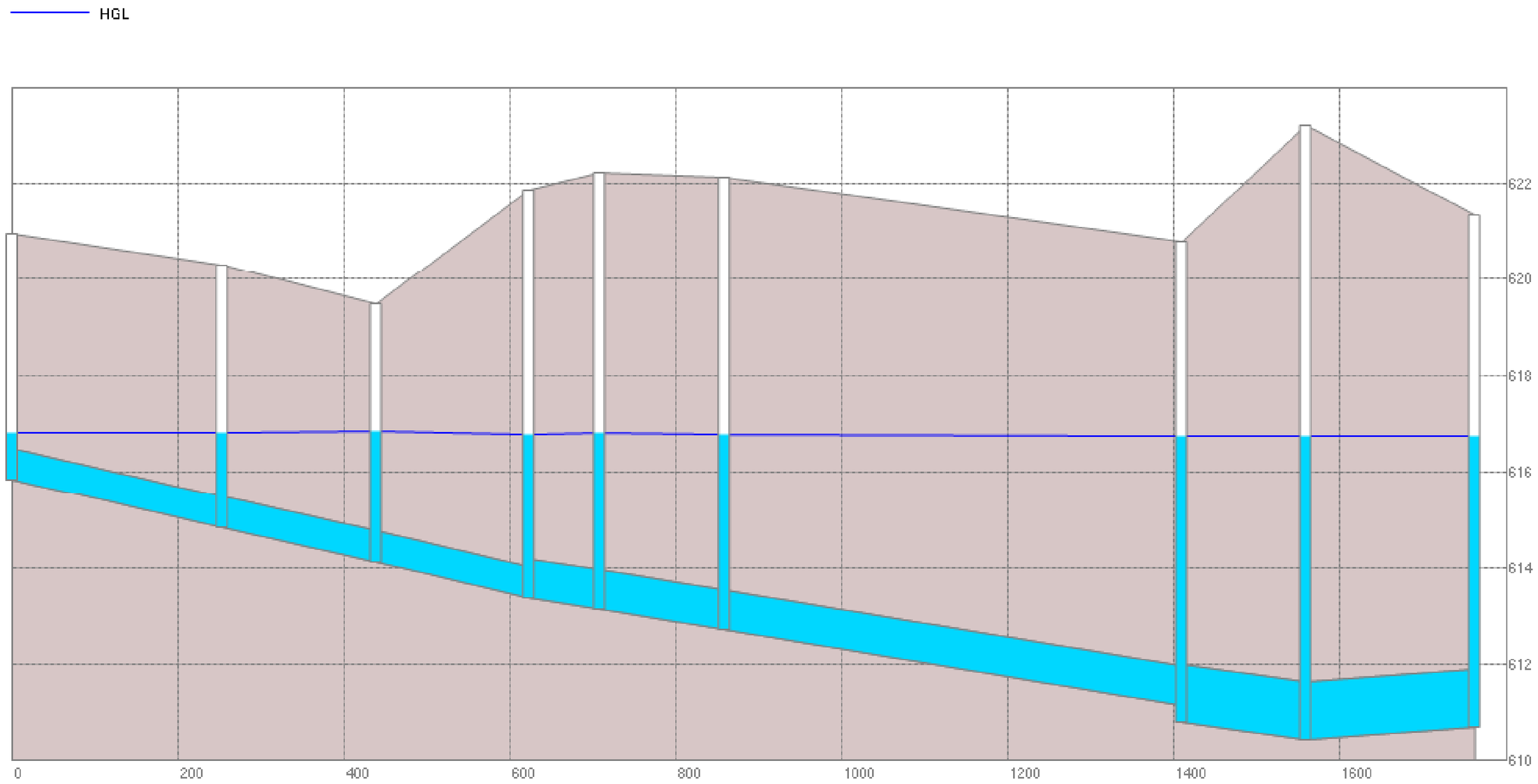
Figure 7
Cleveland Circle to Lift Station
(1.5'-4' Dia.)



CDM	Taft Street Lift Station Analysis Peak Hydraulic Grade Line for 3.2 MGD Constant Flow / Pump Failure Scenario	Figure 8 Taft Street from Merrillville Conservancy District Boundary to Turkey Creek (4’ Dia.)



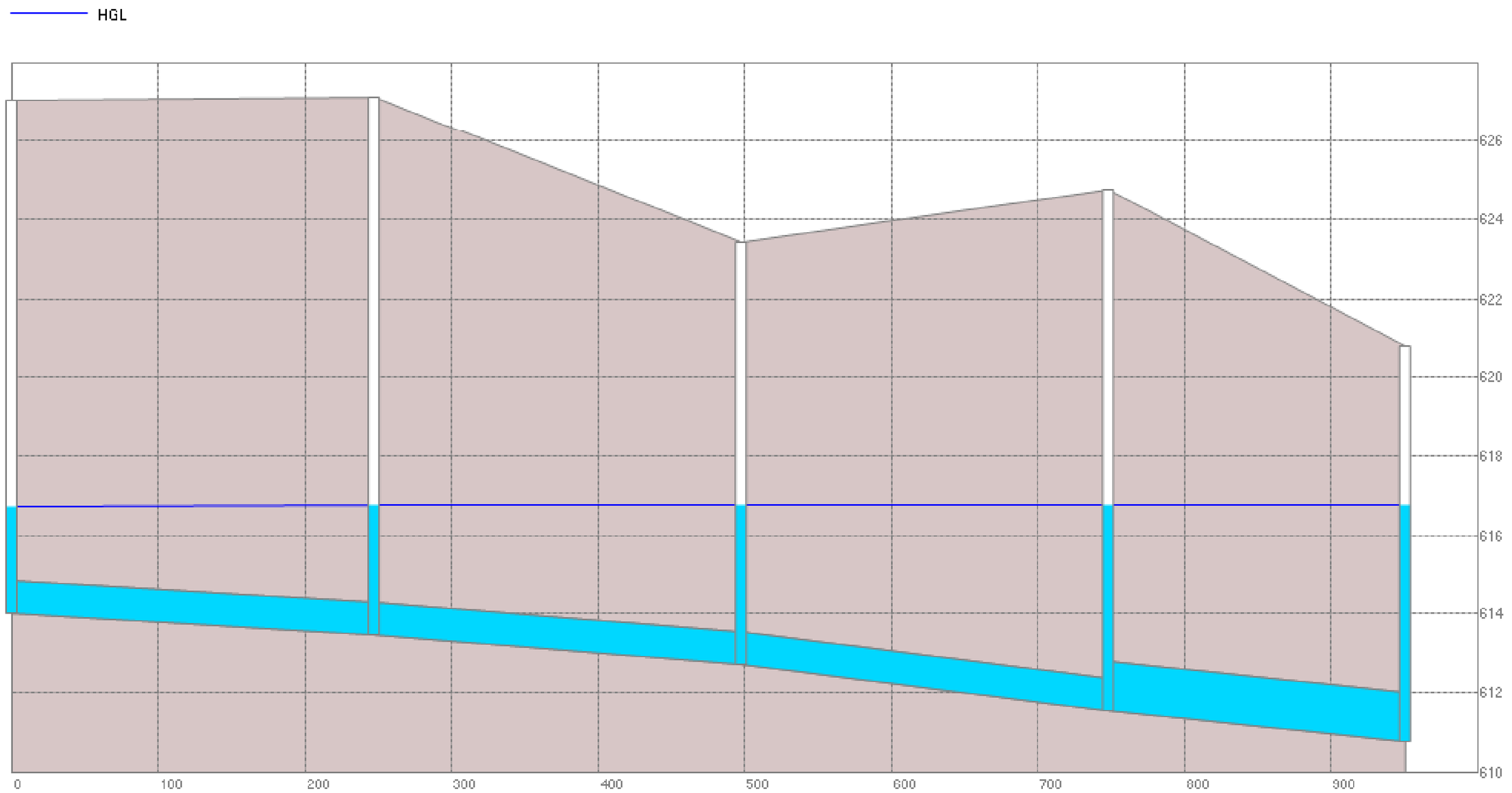
CDM	Taft Street Lift Station Analysis Peak Hydraulic Grade Line for 3.2 MGD Constant Flow / Pump Failure Scenario	Figure 9 Taft Place to Railroad (2’ Dia.)



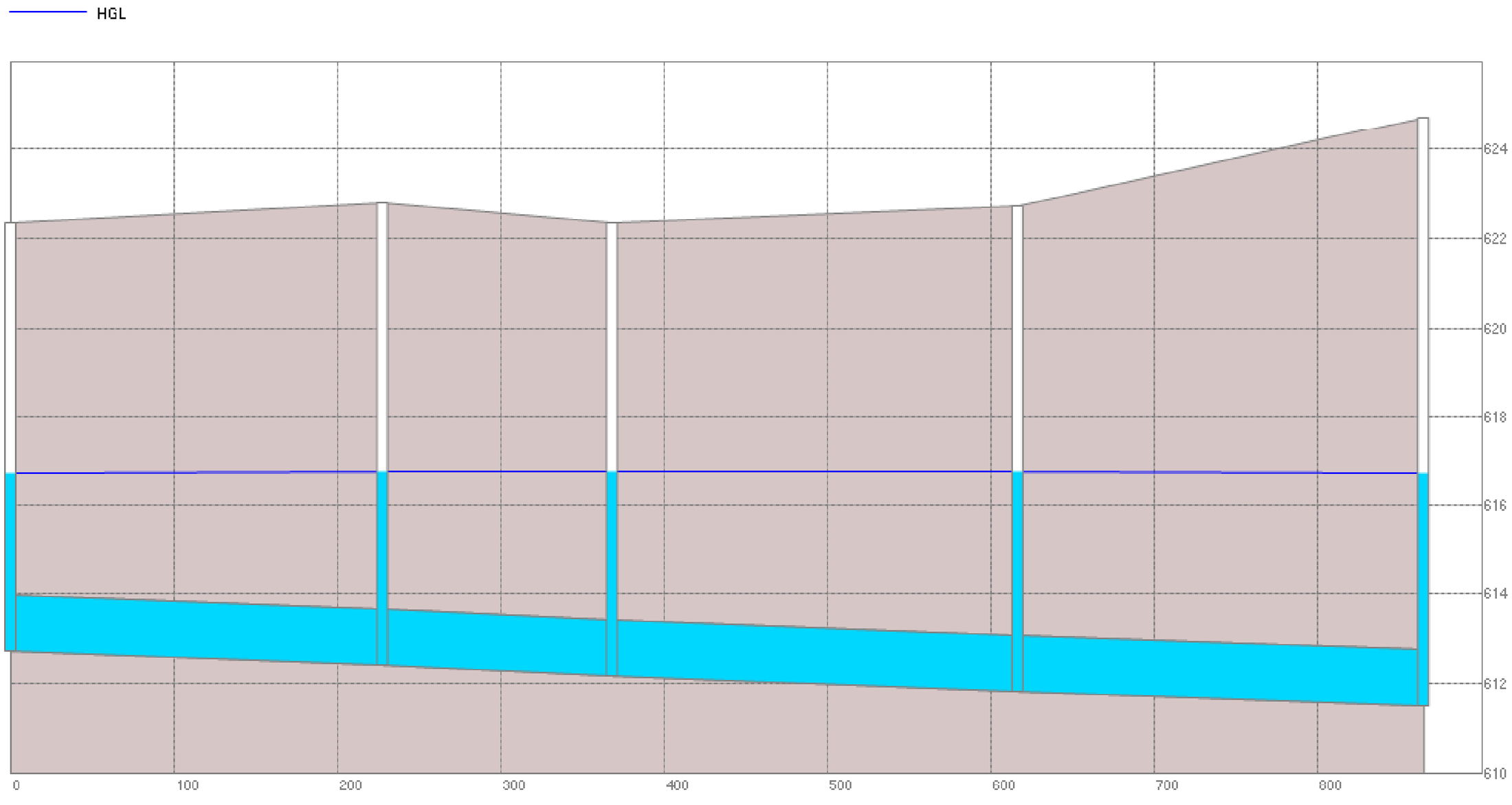
CDM

Taft Street Lift Station Analysis
Peak Hydraulic Grade Line for 3.2 MGD Constant Flow / Pump Failure Scenario

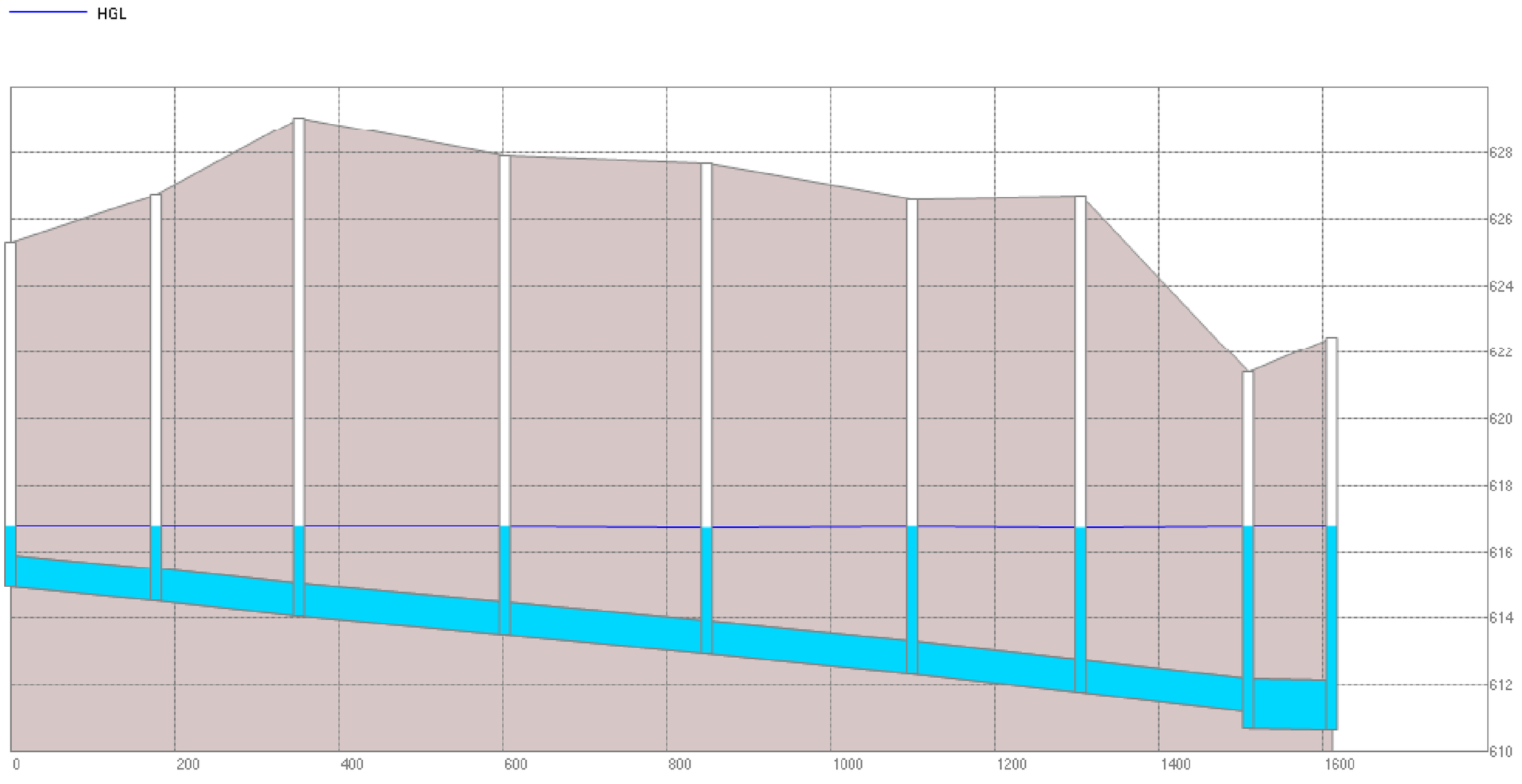
Figure 10
Taft Place / 61st Place to Railroad
(8”-1.25’ Dia.)



CDM	Taft Street Lift Station Analysis Peak Hydraulic Grade Line for 3.2 MGD Constant Flow / Pump Failure Scenario	Figure 11 Between 61st Avenue and 61st Place (10”-1.25’ Dia.)



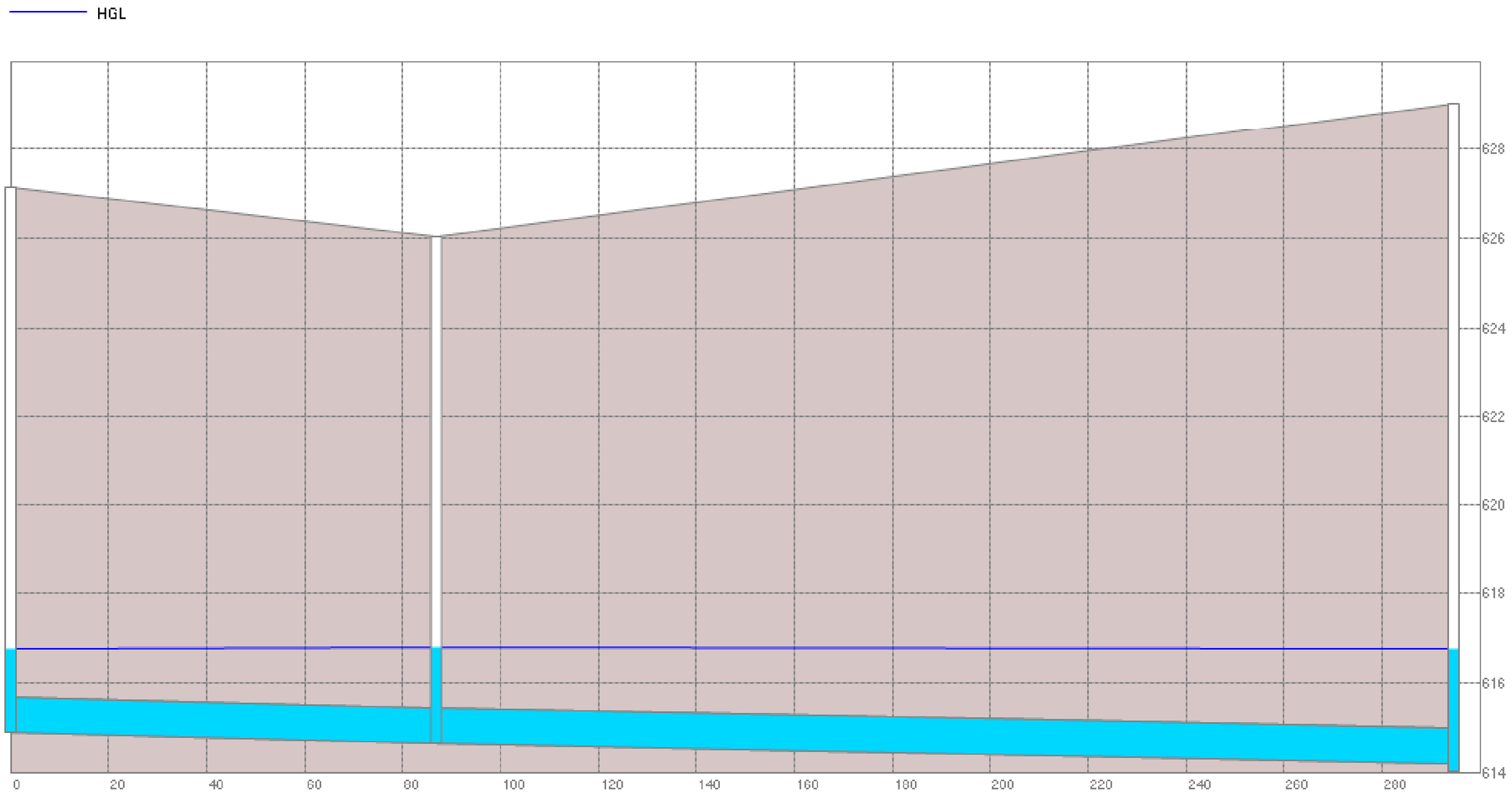
CDM	Taft Street Lift Station Analysis Peak Hydraulic Grade Line for 3.2 MGD Constant Flow / Pump Failure Scenario	Figure 12 South of 60th Drive Between Taft Place and Rutledge Court (1.25' Dia.)



CDM

Taft Street Lift Station Analysis
Peak Hydraulic Grade Line for 3.2 MGD Constant Flow / Pump Failure Scenario

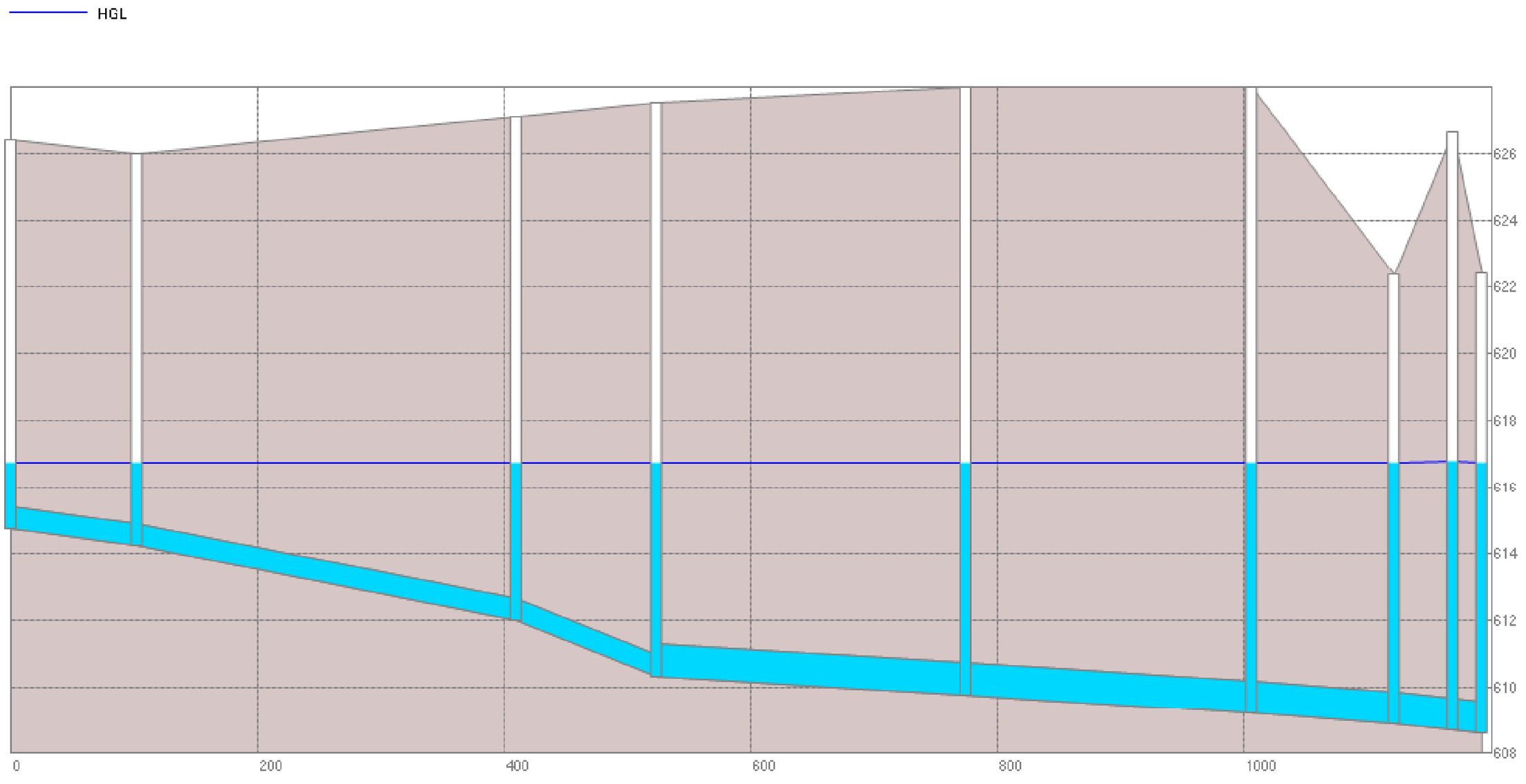
Figure 13
Parallel to Grand Truck Western Railroad (1-1.5’ Dia.)



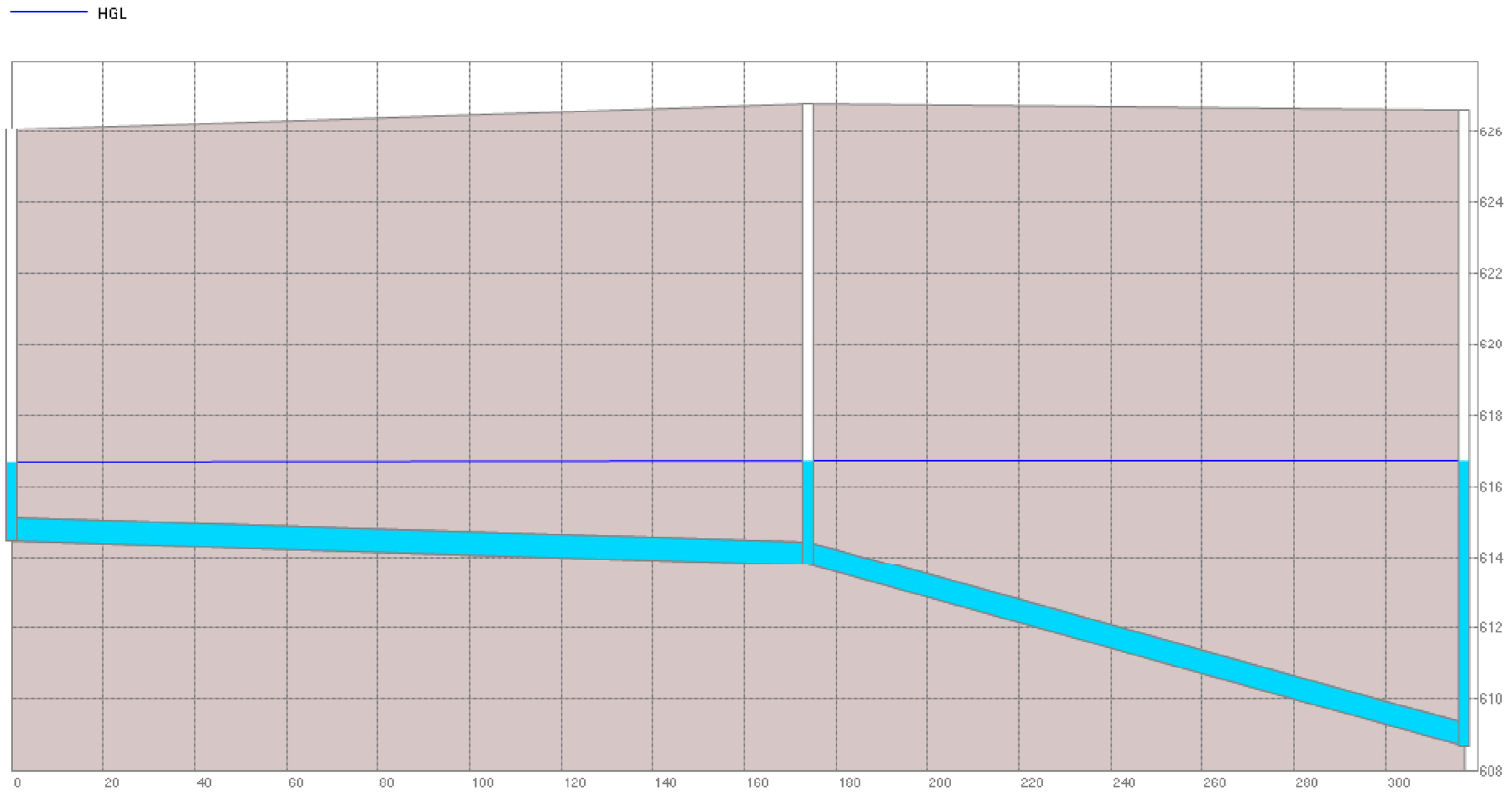
CDM

Taft Street Lift Station Analysis
Peak Hydraulic Grade Line for 3.2 MGD Constant Flow / Pump Failure Scenario

Figure 14
East of Intersection of 60th Drive and 61st Place to Railroad (10” Dia.)



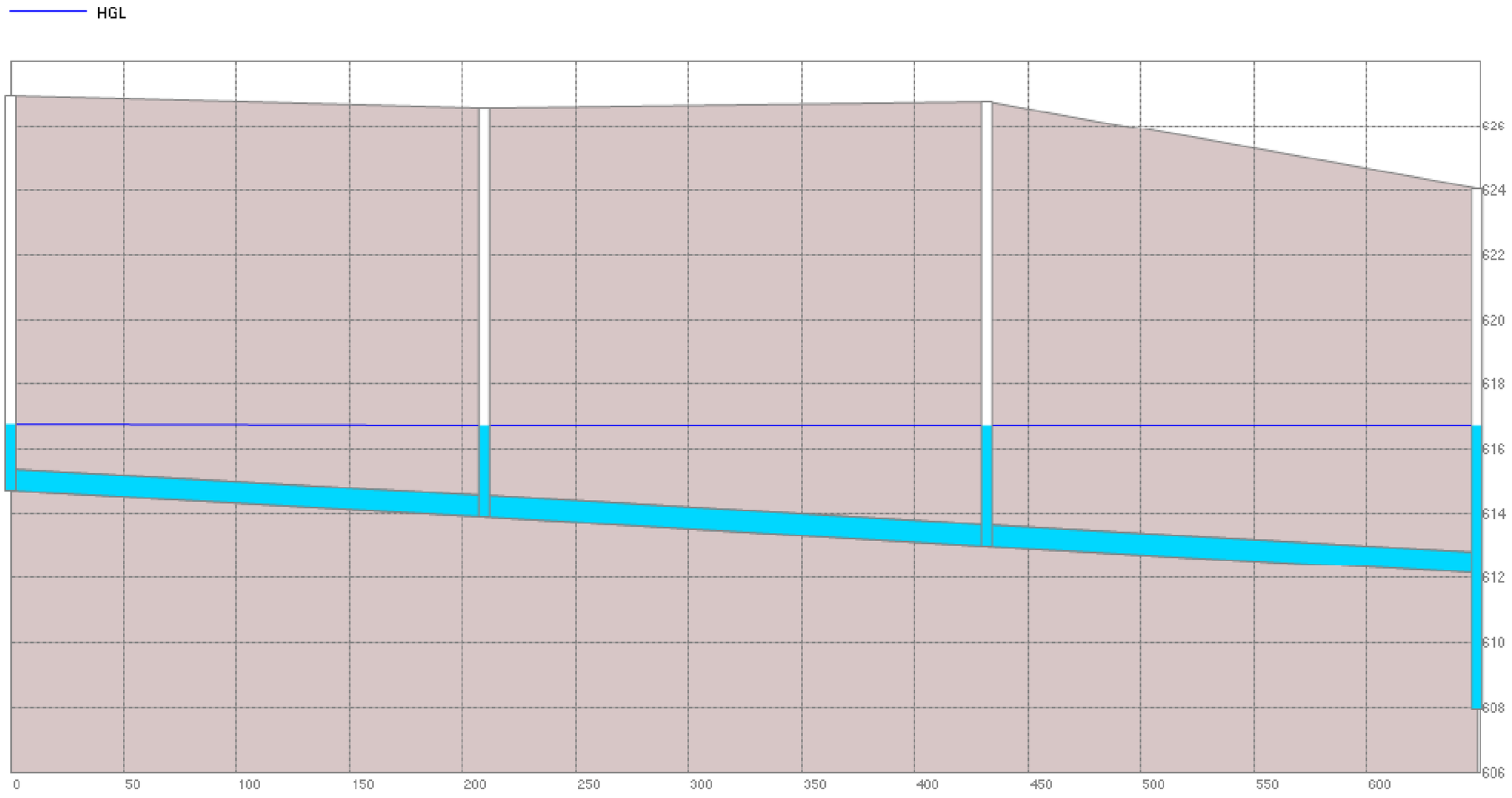
CDM	Taft Street Lift Station Analysis Peak Hydraulic Grade Line for 3.2 MGD Constant Flow / Pump Failure Scenario	Figure 15 63rd Lane from Marshall Court to Ellsworth Place (8”-1’ Dia.)



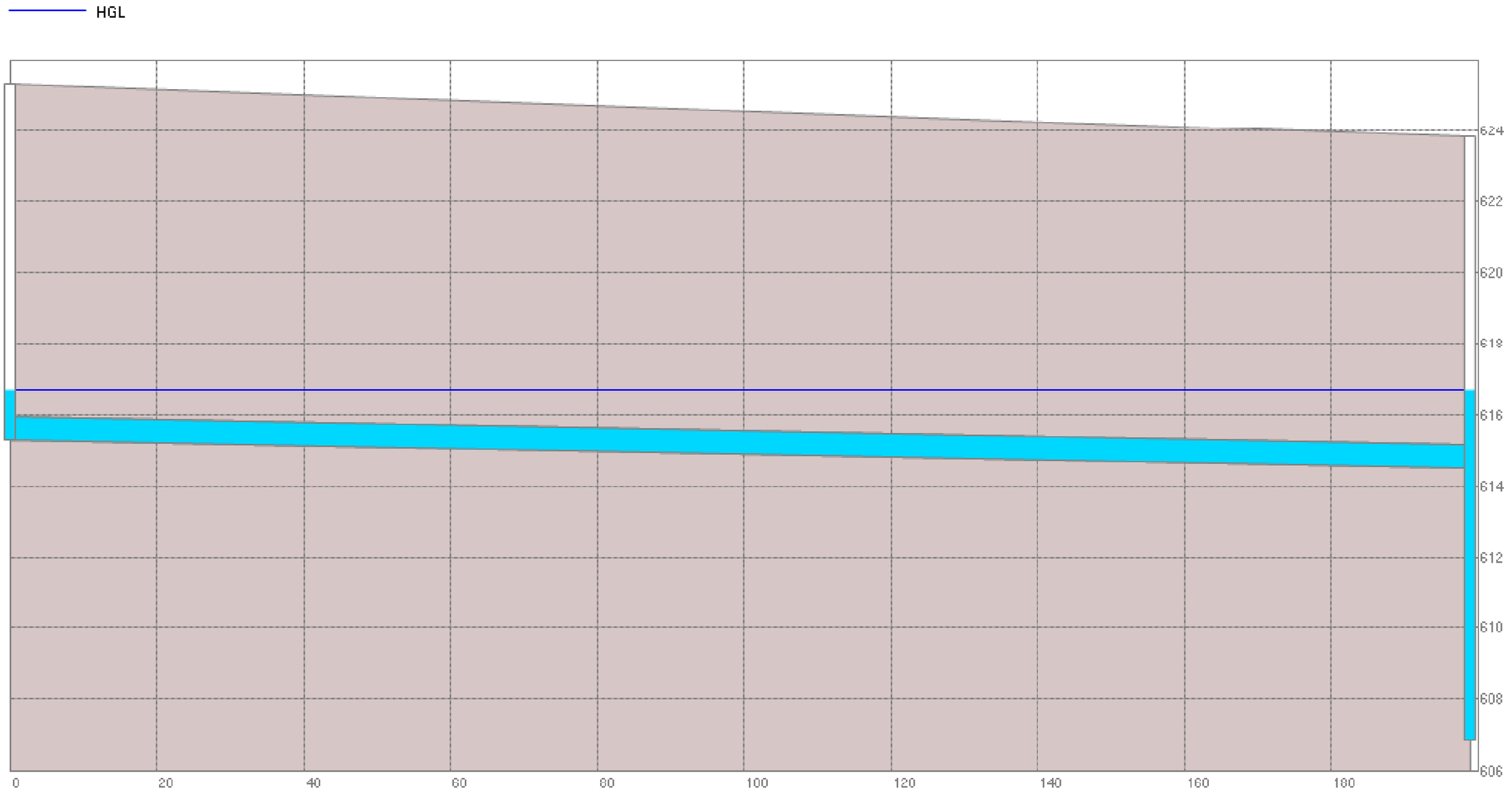
CDM

Taft Street Lift Station Analysis
Peak Hydraulic Grade Line for 3.2 MGD Constant Flow / Pump Failure Scenario

Figure 16
East of Ellsworth Place, South of 63rd Avenue (8” Dia.)



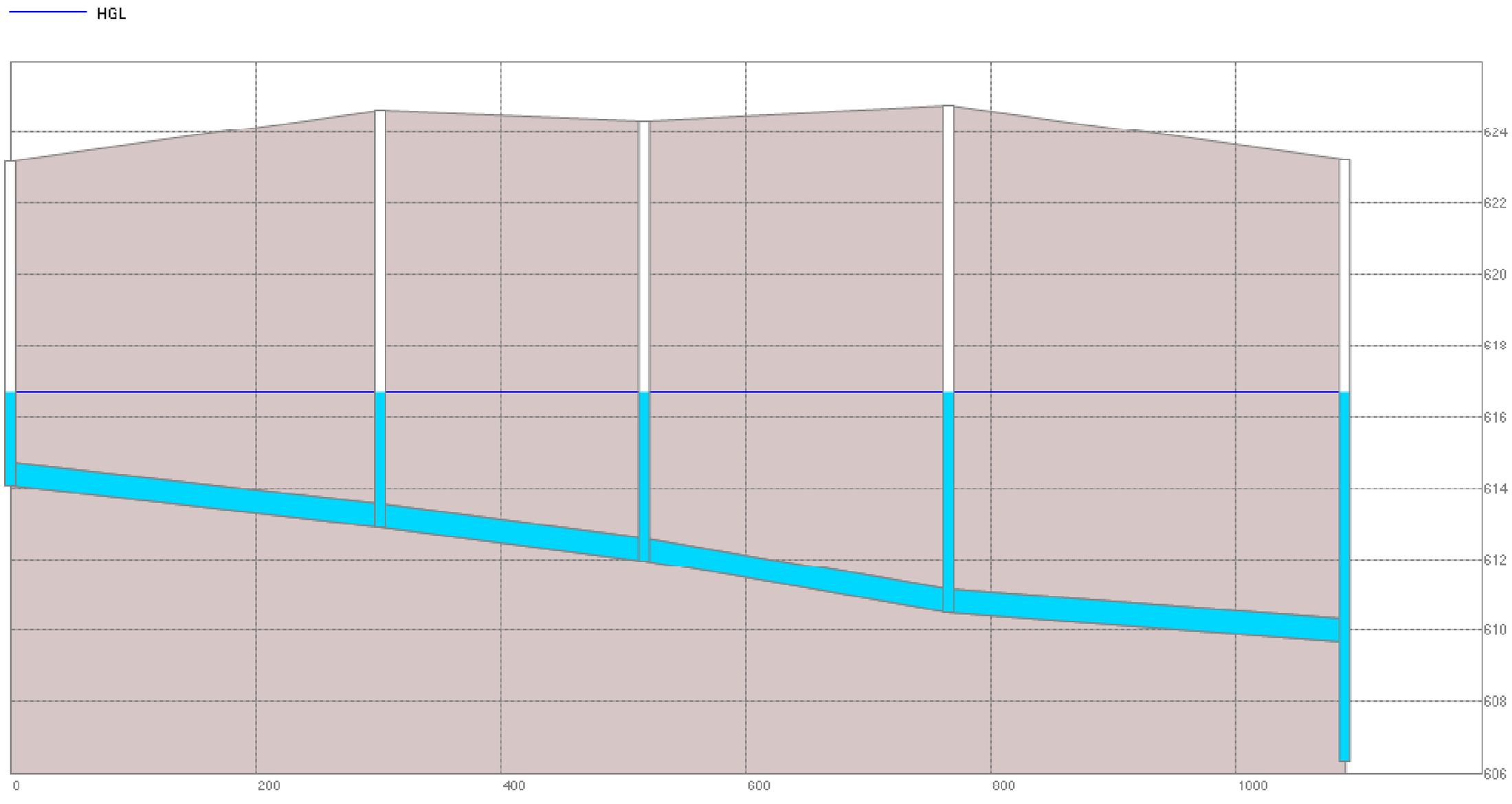
CDM	Taft Street Lift Station Analysis Peak Hydraulic Grade Line for 3.2 MGD Constant Flow / Pump Failure Scenario	Figure 17 East of Ellsworth Place Between 63rd Court and 64th Avenue (8” Dia.)



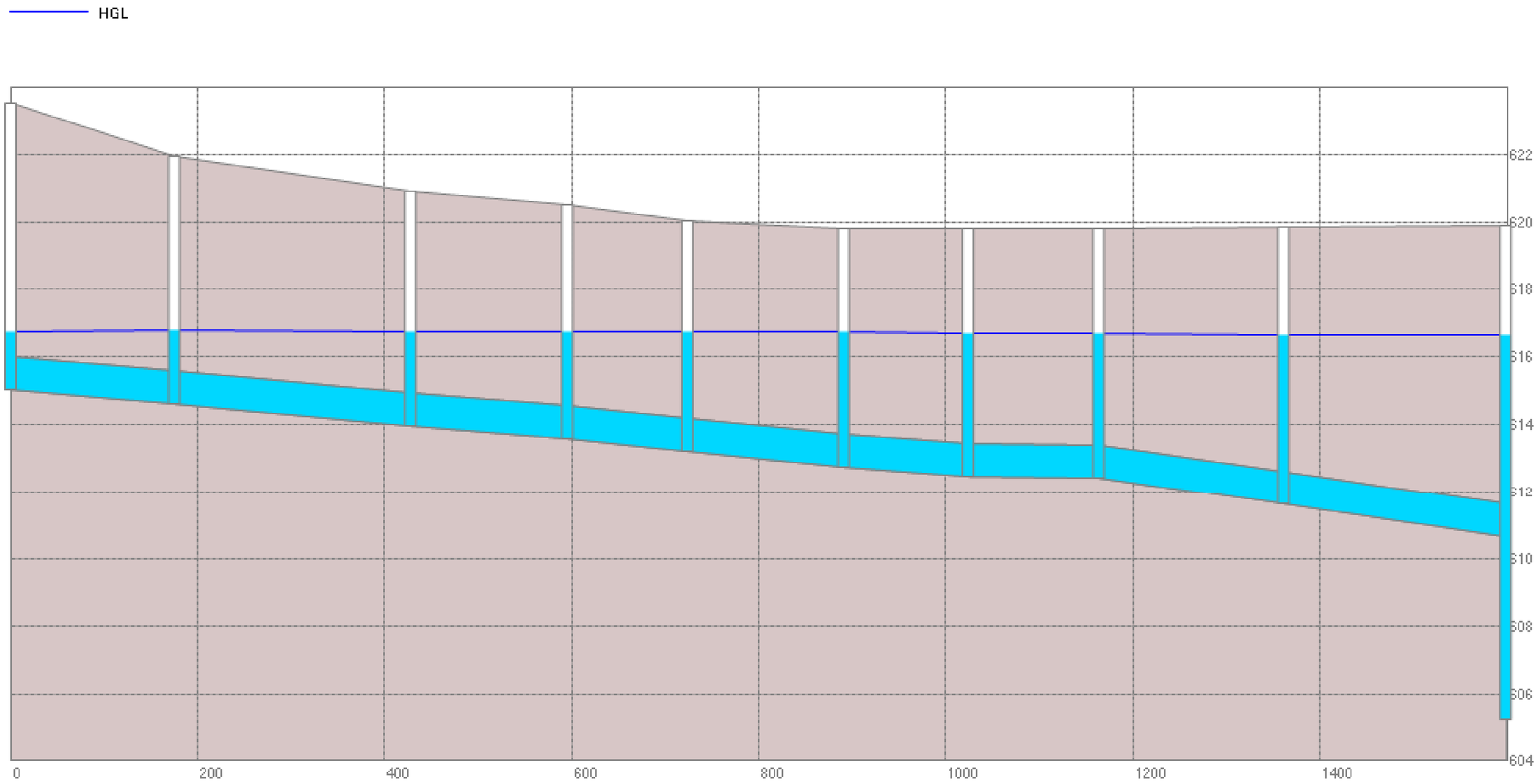
CDM

Taft Street Lift Station Analysis
Peak Hydraulic Grade Line for 3.2 MGD Constant Flow / Pump Failure Scenario

Figure 18
East of Ellsworth Place Between 64th Avenue and 64th Place (8” Dia.)



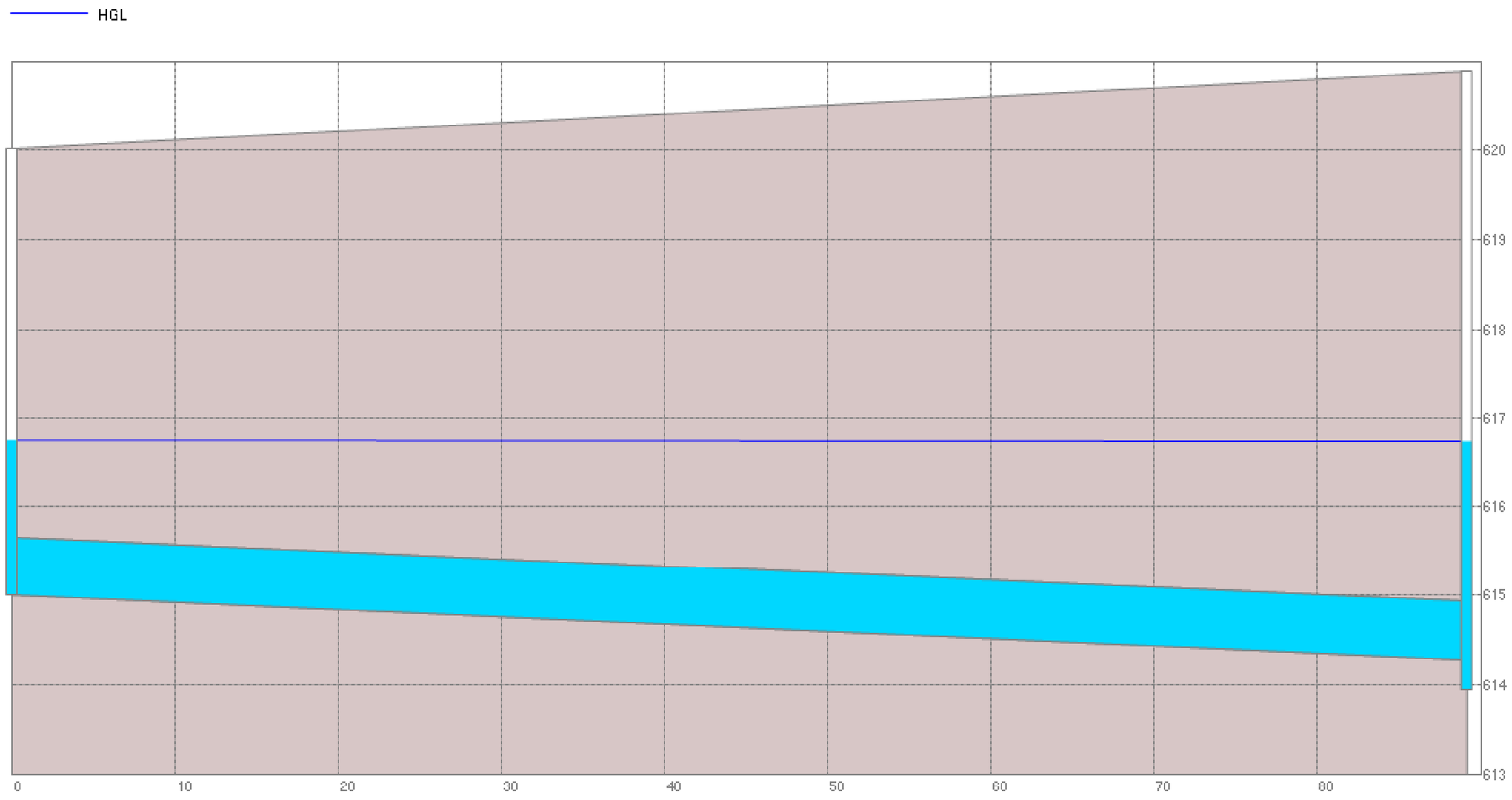
CDM	Taft Street Lift Station Analysis Peak Hydraulic Grade Line for 3.2 MGD Constant Flow / Pump Failure Scenario	Figure 19 East of Ellsworth Place Between 64th Place and 65th Avenue (8” Dia.)



CDM

Taft Street Lift Station Analysis
Peak Hydraulic Grade Line for 3.2 MGD Constant Flow / Pump Failure Scenario

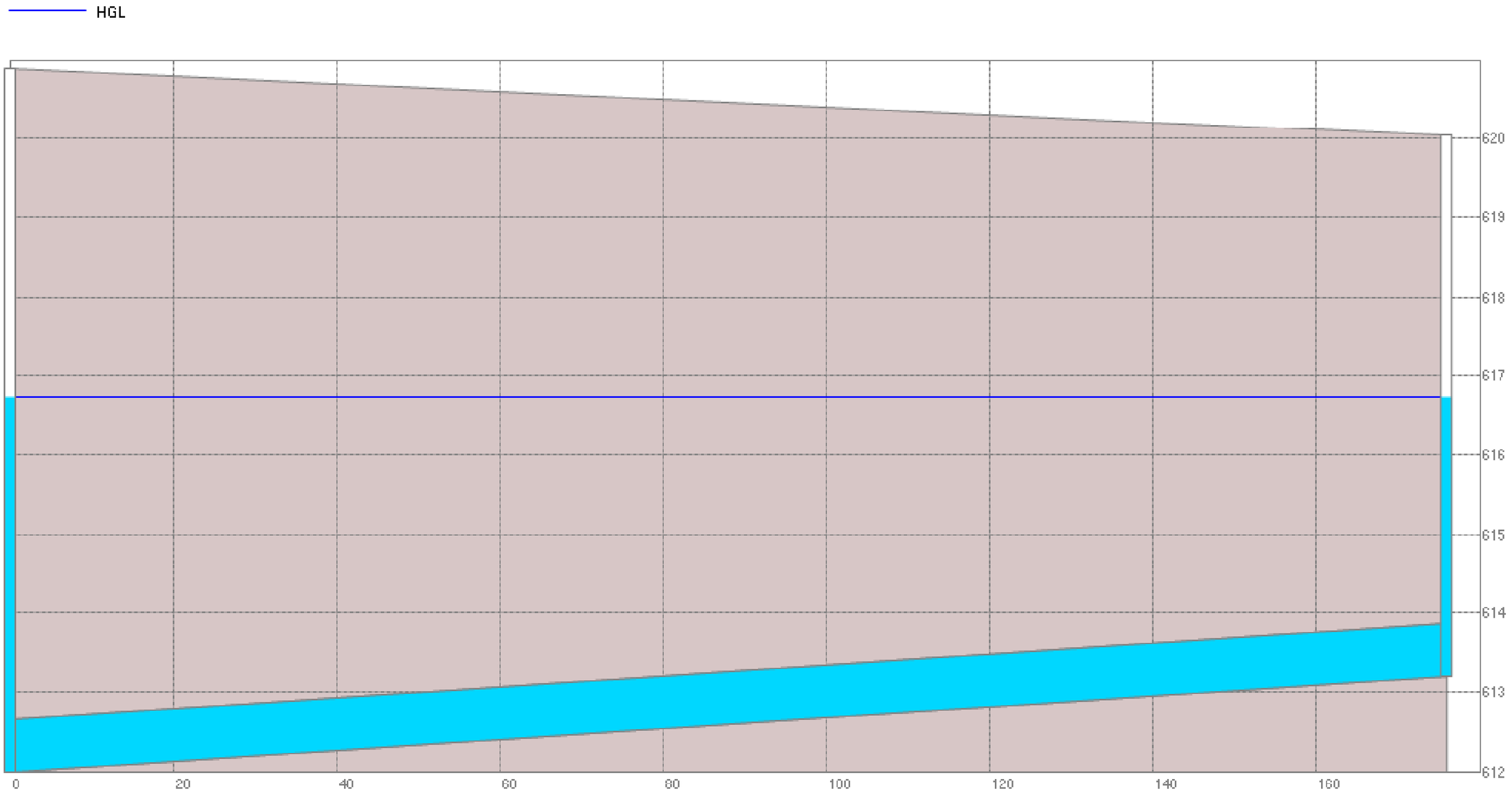
Figure 20
65th Place
(1’ Dia.)



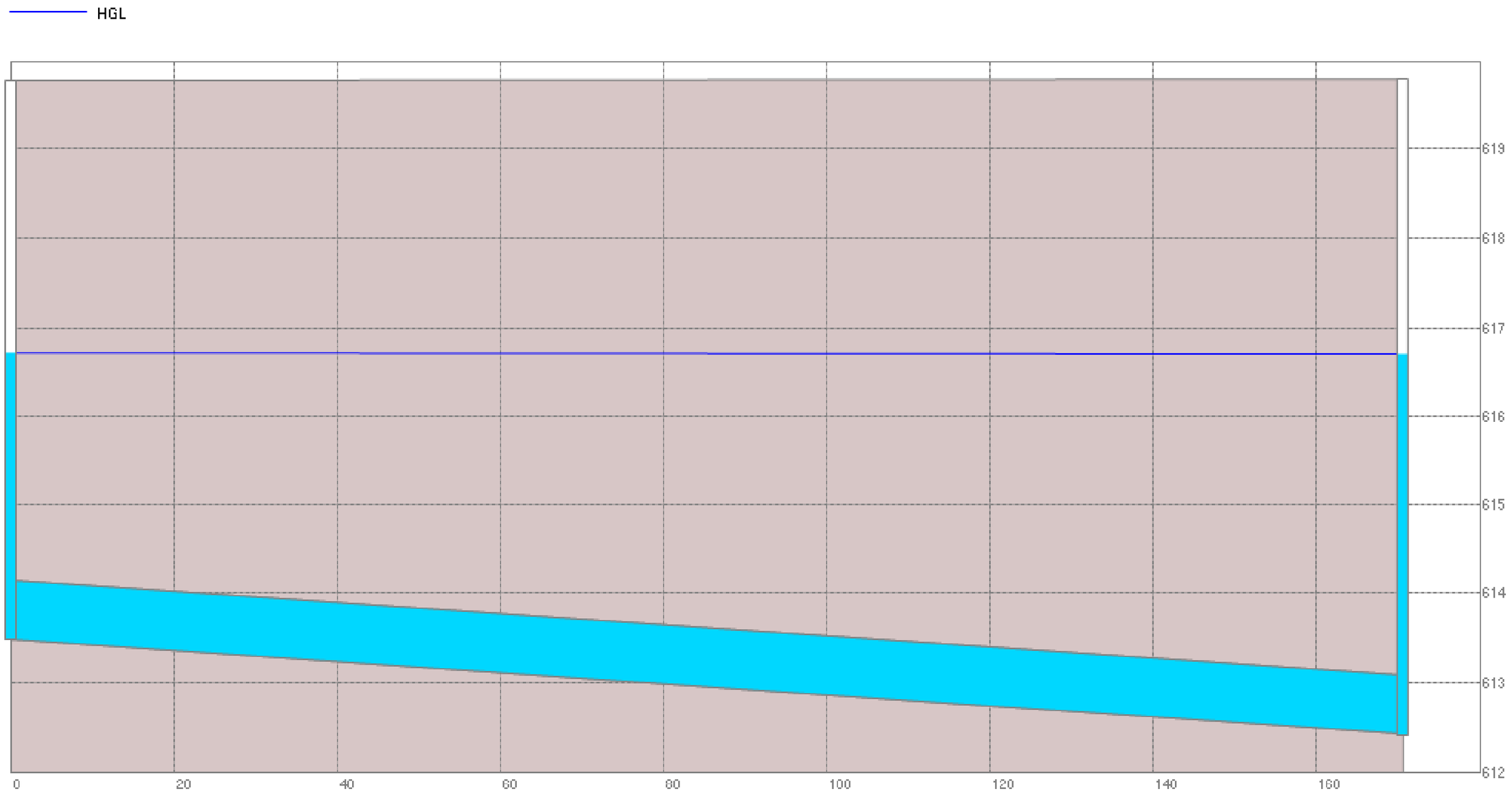
CDM

Taft Street Lift Station Analysis
Peak Hydraulic Grade Line for 3.2 MGD Constant Flow / Pump Failure Scenario

Figure 21
Western Knuckle on 65th Place
(8” Dia.)



CDM	Taft Street Lift Station Analysis Peak Hydraulic Grade Line for 3.2 MGD Constant Flow / Pump Failure Scenario	Figure 22 Taney Court to 65th Place (8” Dia.)



CDM

Taft Street Lift Station Analysis
Peak Hydraulic Grade Line for 3.2 MGD Constant Flow / Pump Failure Scenario

Figure 23
Marshall Court to 65th Place
(8” Dia.)